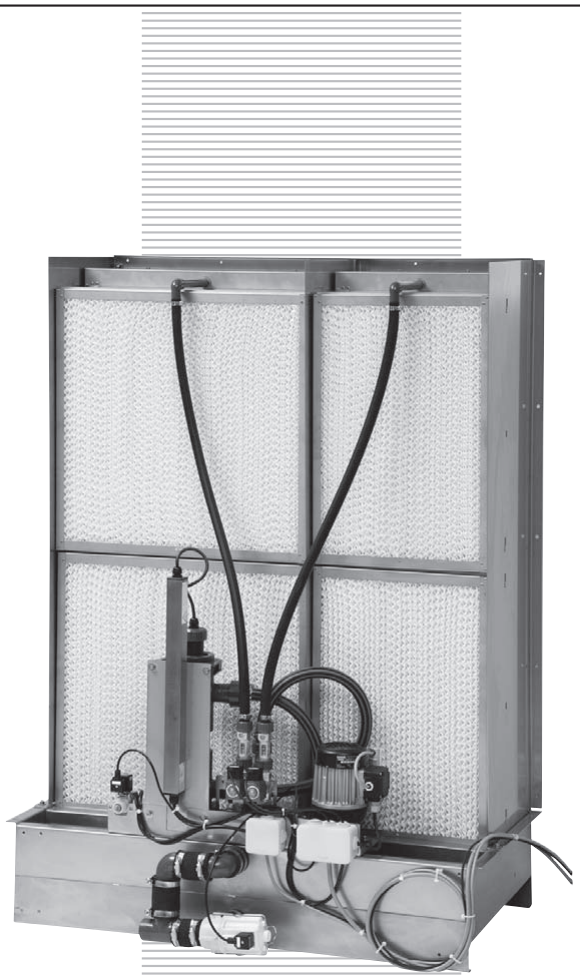
Condair SH2

Installation and operating instructions



Adiabatic
Humidifiers

For a better climate

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1 Introduction

1.1 To the very beginning

We thank you for having purchased the **Adiabatic Air Humidifier Condair SH2**.

The adiabatic air humidifier Condair SH2 incorporates the latest technical advances and meets all recognized safety standards. Nevertheless, improper use of the adiabatic air humidifier Condair SH2 may result in danger to the user or third parties and/or impairment of material assets.

To ensure a safe, proper, and economical operation of the adiabatic air humidifier Condair SH2, please observe and comply with all information and safety instructions contained in the present installation and operating instructions as well as in the separate documentations of the components installed in the humidification system.

If you have questions, which are not or insufficiently answered in this documentation, please contact your Condair supplier. They will be glad to assist you.

1.2 Notes on the installation and operating instructions

Limitation

The subject of these installation and operating instructions is the adiabatic air humidifier Condair SH2. The various accessories are only described insofar as this is necessary for proper operation of the equipment. Further information on accessories can be obtained in the respective instructions.

These installation and operating instructions are restricted to the **installation, commissioning, operation, servicing,** and **trouble-shooting** of the adiabatic air humidifier Condair SH2 and is meant for **well trained personnel being sufficiently qualified for their respective work**.

The installation and operating instructions are supplemented by various separate items of documentation (spare parts list, manuals for accessories, etc.). Where necessary, appropriate cross-references are made to these publications in the installation and operating instructions.

Symbols used in this manual

CAUTION!

The catchword "CAUTION" designates notes in this installation and operating instructions that, if neglected, may cause **damage and/or malfunction of the unit or other material assets**.

WARNING!

The catchword "WARNING" used in conjunction with the general caution symbol designates safety and danger notes in this installation and operating instructions that, if neglected, may cause to **injury to persons**.

DANGER!

The catchword "DANGER" used in conjunction with the general caution symbol designates safety and danger notes in this installation and operating instructions that, if neglected, may lead to **severe injury or even death of persons**.

Safekeeping

Please safeguard these installation and operating instructions in a safe place, where they can be immediately accessed. If the equipment changes hands, the documentation must be passed on to the new operator.

If the documentation gets mislaid, please contact your Condair supplier.

Language versions

These installation and operating instructions are available in various languages. Please contact your Condair supplier for information.

Copyright protection

The present installation and operating instructions is protected under the Copyright Act. Passing-on and reproduction of the manual (or part thereof) as well as exploitation and communication of the contents are prohibited without written permission by Axair Ltd.. Violation of copyright terms is subject to legal prosecution and arises liability for indemnification.

Axair Ltd. reserves the right to fully exploit commercial patent rights.

2 For your safety

General

Every person working with the Condair SH2 must have read and understood the installation and operating instructions before carrying out any work.
Knowing and understanding the contents of the installation and operating instructions is a basic requirement for protecting the personnel against any kind of danger, to prevent faulty operation, and to operate the unit safely and correctly.

All ideograms, signs and markings applied to the unit must be observed and kept in readable state.

Qualification of personnel

All work (installation, operating, servicing , etc.) described in these installation and operating instructions **may only be carried out by specialist who are well trained and adequately qualified and are authorized by the customer**.
For safety and warranty reasons any action beyond the scope of this manual must be carried out only by qualified personnel authorised by Axair Ltd.

It is assumed that all persons working with the Condair SH2 are familiar and comply with the appropriate regulations on work safety and the prevention of accidents.

Intended use

The adiabatic air humidifier/cooler Condair SH2 are intended exclusively for **air humidification/air cooling in air ducts or monoblocs** within the specified operating conditions (see chapter 9 "Product specifications". Any other type of application, without the written consent of your Condair supplier, is considered as not conforming with the intended purpose and may lead to the Condair SH2 becoming dangerous.
Operation of the equipment in the intended manner requires **that all the information in these instructions are observed (in particular the safety instructions)**.

Danger that may arise from the unit

– **Some components of the Condair SH2 are mains powered.**

⚠ **DANGER!**	**One may get in touch with live parts when the control unit or the distribution boxes are open. Touching live parts may cause severe injury or danger to life.**

Prevention: Before carrying out any work set the Condair SH2 out of operation as described in chapter 5.4 (switch off the unit, disconnect it from the mains and stop the water supply) and secure the unit against inadvertent power-up.

– **The UV lamp used in the water treatment unit (option) emits harmful UV-C rays.**

⚠ **WARNING!**	**If the UV lamp is operated outside the housing, the emitted UV-C rays may damage the eyes lasting.**

Prevention: Never operate the UV lamp outside the housing.

– **Badly maintained humidifiers can endanger the health**.

⚠ **WARNING!**	**If the unit is insufficient maintained ill-making germs may grow in the water tub and the humidification boxes (and the mist eliminator) of the Condair SH2 and may can affect the air passing through the humidifier.**

Prevention: The Condair SH2 must be cleaned in the prescribed intervals according to the information given in chapter 6 "Maintenance". The cleaning works must be carried out correctly and the humidification boxes and the mist eliminator boxes must be replaced after their prescribed lifetime has elapsed.

Behaviour in case of danger

If it is suspected that **safe operation is no longer possible**, then the Condair SH2 should immediately **be shut down and secured against accidental power-up** according to chapter 5.4. This can be the case under the following circumstances:

– if the Condair SH2 is damaged
– if the Condair SH2 is no longer operating correctly
– if connections and/or piping are not sealed
– if electrical cables are defective

All persons working with the Condair SH2 must report any alterations to the unit that may affect safety to the owner without delay.

Prohibited modifications to the unit

No modifications must be undertaken on the Condair SH2 without the express written consent of Axair Ltd.

For the replacement of defective components use exclusively **original accessories and spare parts** available from your Condair supplier.

3 Product overview

3.1 Model overview

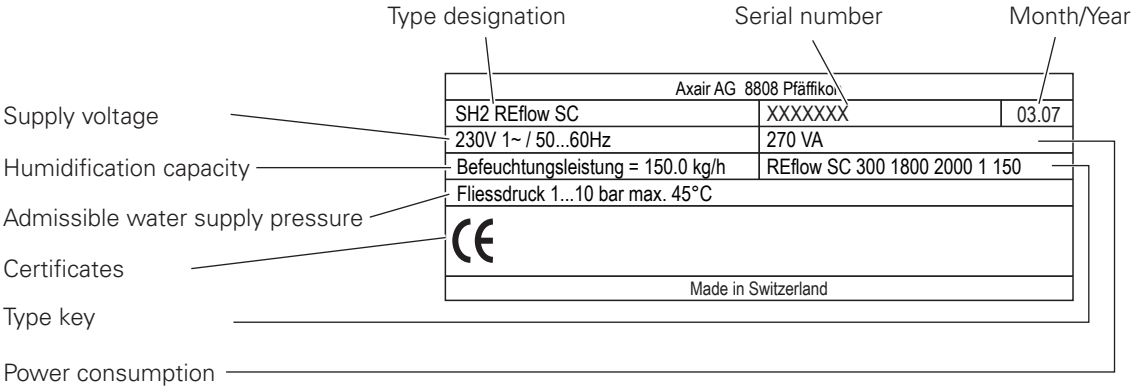
The Condair SH2 is available in the two base versions "flow" with direct water system and "REflow" with circulating water system. The following **base models** are available:

- **Condair SH2 flow**
- **Condair SH2 flow C** (with control unit RC and On/Off control)
- **Condair SH2 flow SC** (with control unit SH2 and step control)
- **Condair SH2 REflow**
- **Condair SH2 REflow C** (with control unit SH2 and On/Off control)
- **Condair SH2 REflow SC** (with control unit SH2 and step control)

All base models can be extended in their functions by different options. In addition there are different accessories available for all models.

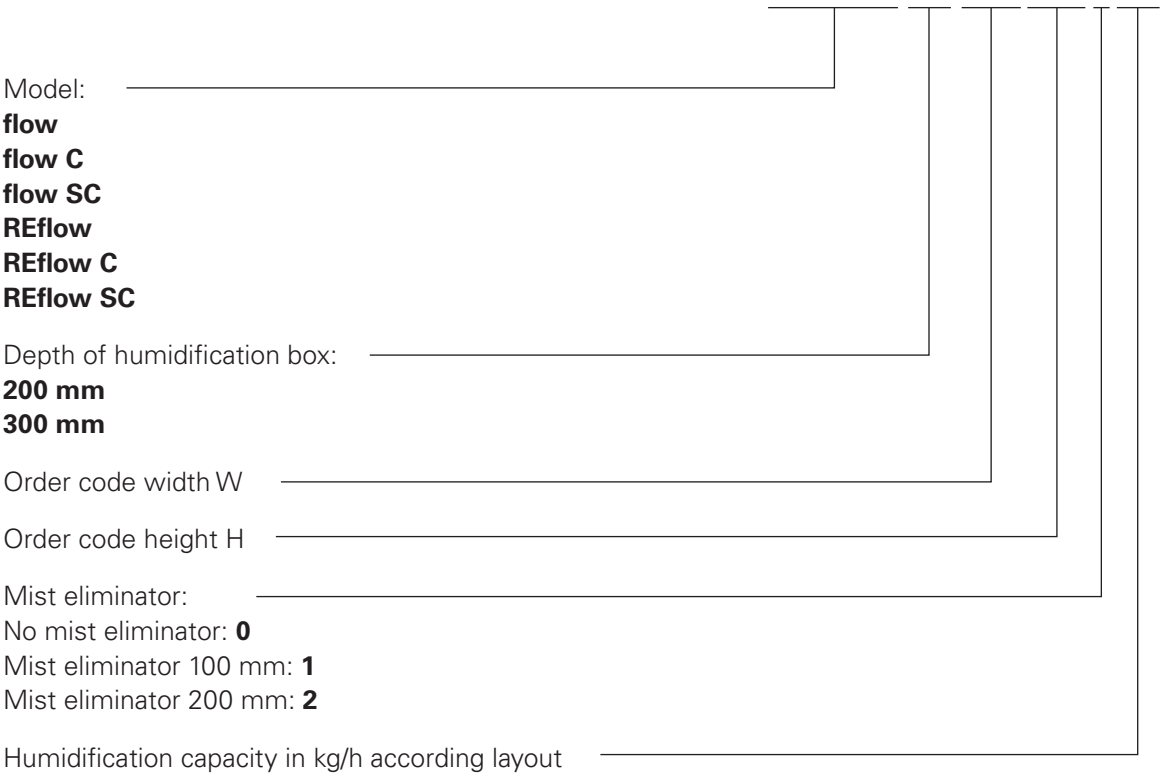
3.2 Product designation

The product designation and the most important unit data are found on the rating plate:



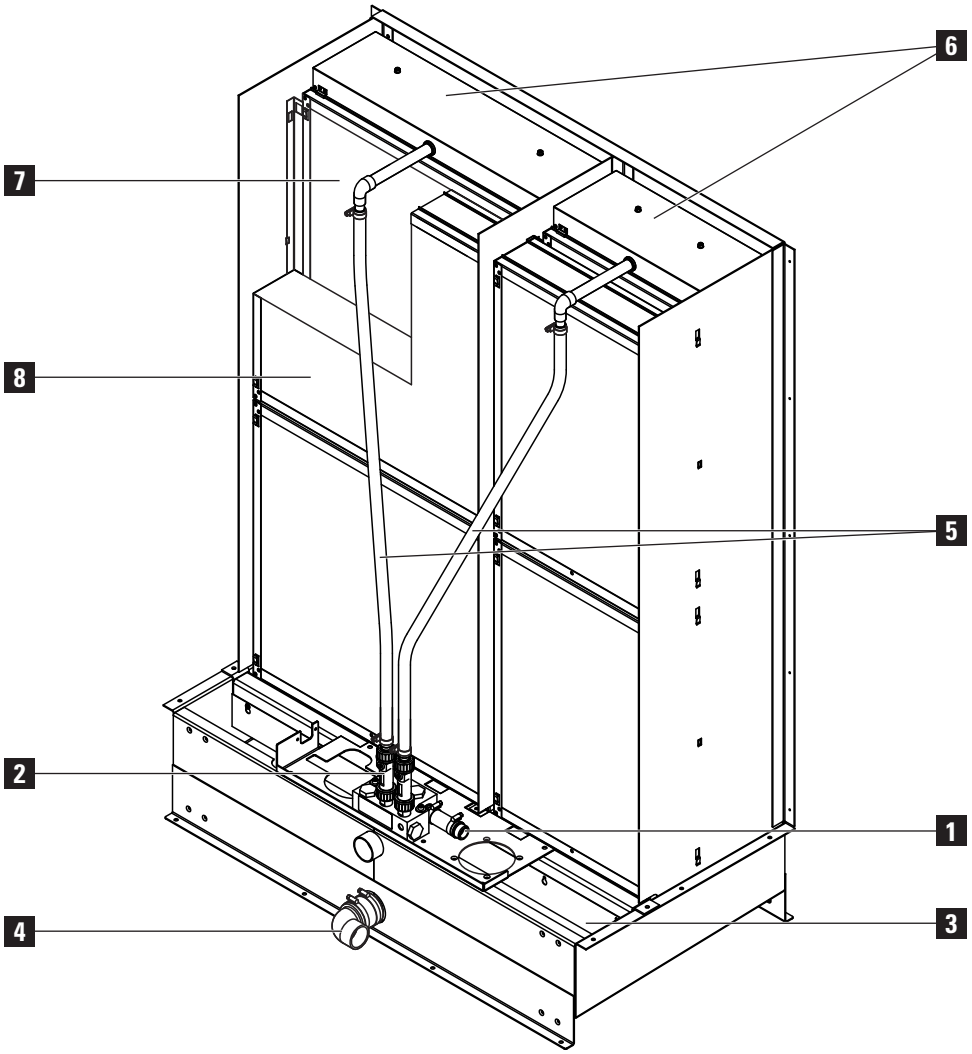
Type key

Example:
Condair SH2 REflow SC 300 1800 2000 0 150



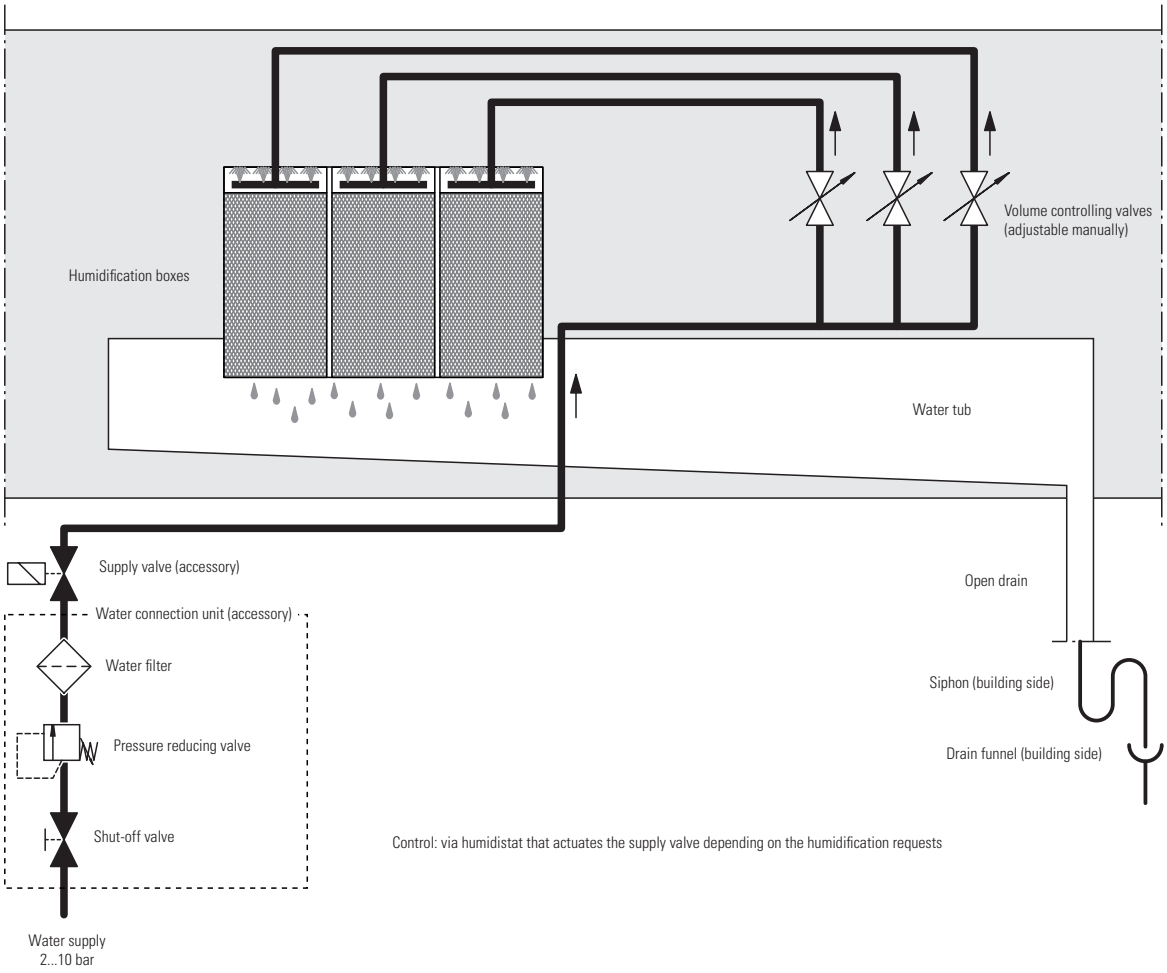
3.3 Model “flow”

3.3.1 Construction model “flow”



1 Water connection on unit R 3/4" (outside thread)
2 Volume controlling valves (adjustable manually)
3 Water tub
4 Open drain (outside diameter 48 mm)
5 Water hoses
6 Trickling hoods with distribution pipes
7 Humidification boxes
8 Mist eliminator (for air speed above humidification boxes >3.5 m/s)

3.3.2 System overview model “flow”



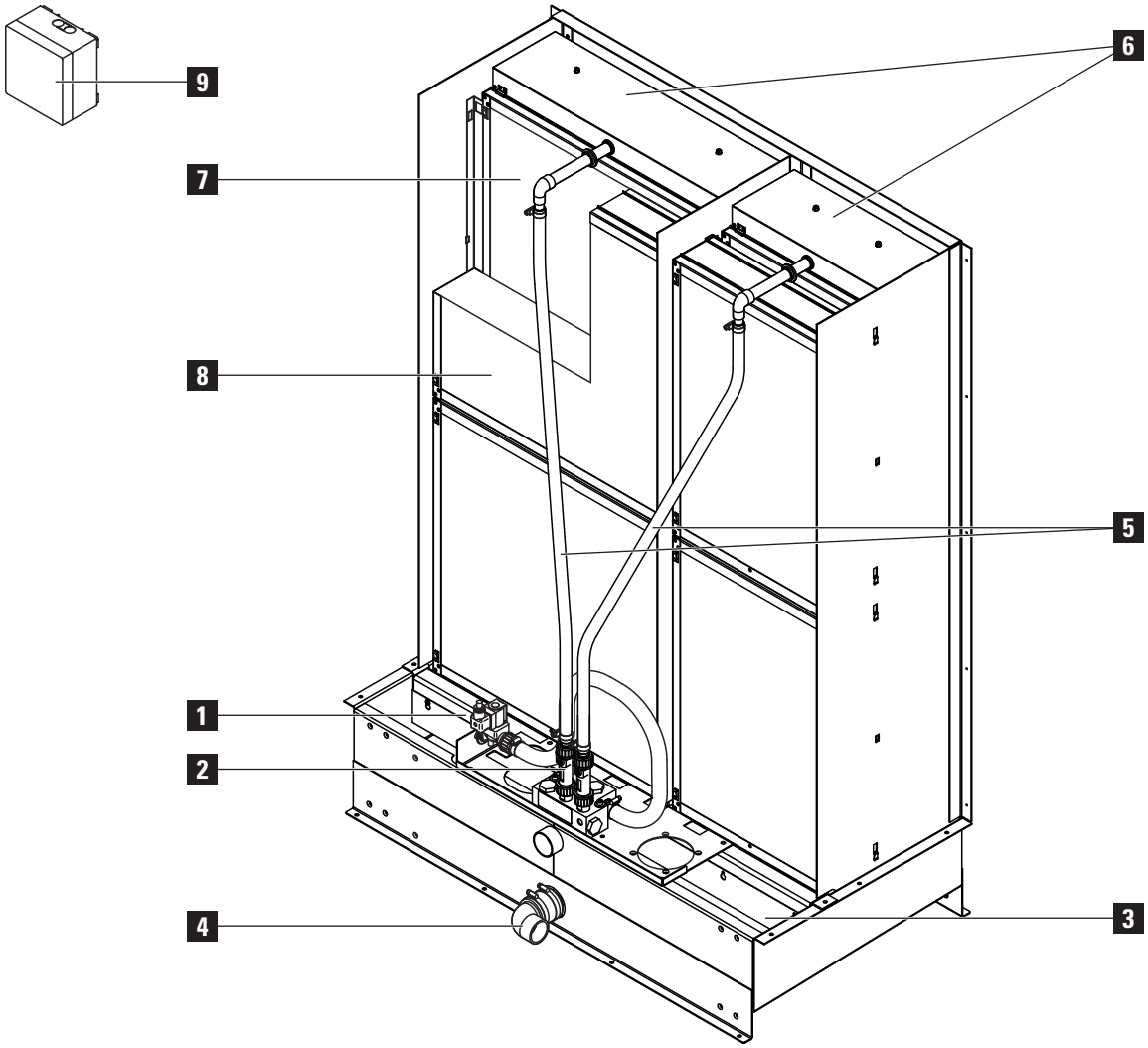
Functional description

In case of a humidification/cooling request the supply valve (accessory) opens and the water flows via the pressure reducing valve (accessory), the water filter (accessory) and the manually adjustable volume controlling valves to the distribution pipes above the humidification boxes.

The distribution pipes evenly supply the water to the entire surface of the humidification boxes where it flows down and humidifies the air flowing through the humidification boxes. The excess water not used for humidification flows to the water tub and then directly to the drain.

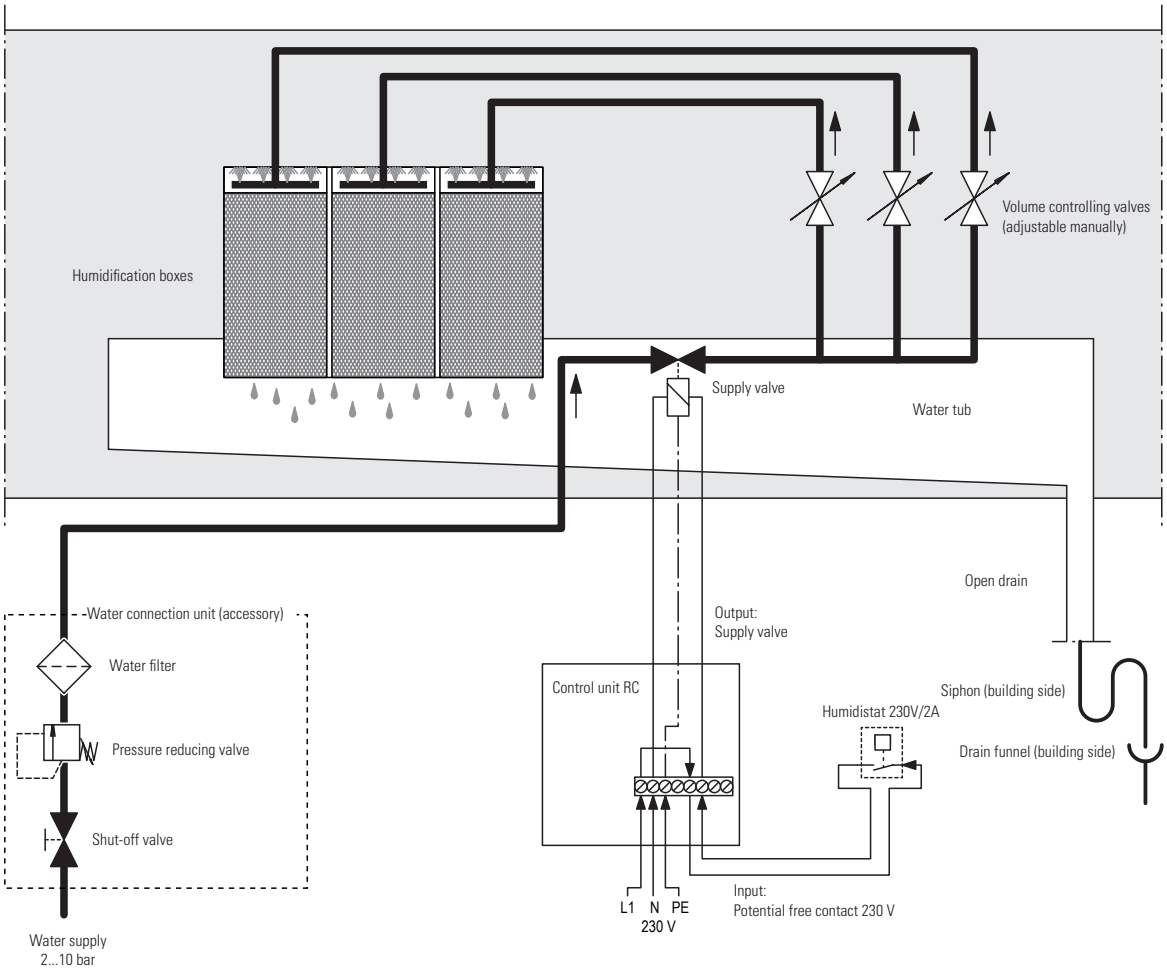
3.4 Model “flow C”

3.4.1 Construction model “flow C”



1 Water connection on unit R 3/4" (outside thread)
2 Volume controlling valves (adjustable manually)
3 Water tub
4 Open drain (outside diameter 48 mm)
5 Water hoses
6 Trickling hoods with distribution pipes
7 Humidification boxes
8 Mist eliminator (for air speed above humidification boxes >3.5 m/s)
9 Control unit RC

3.4.2 System overview model “flow C”



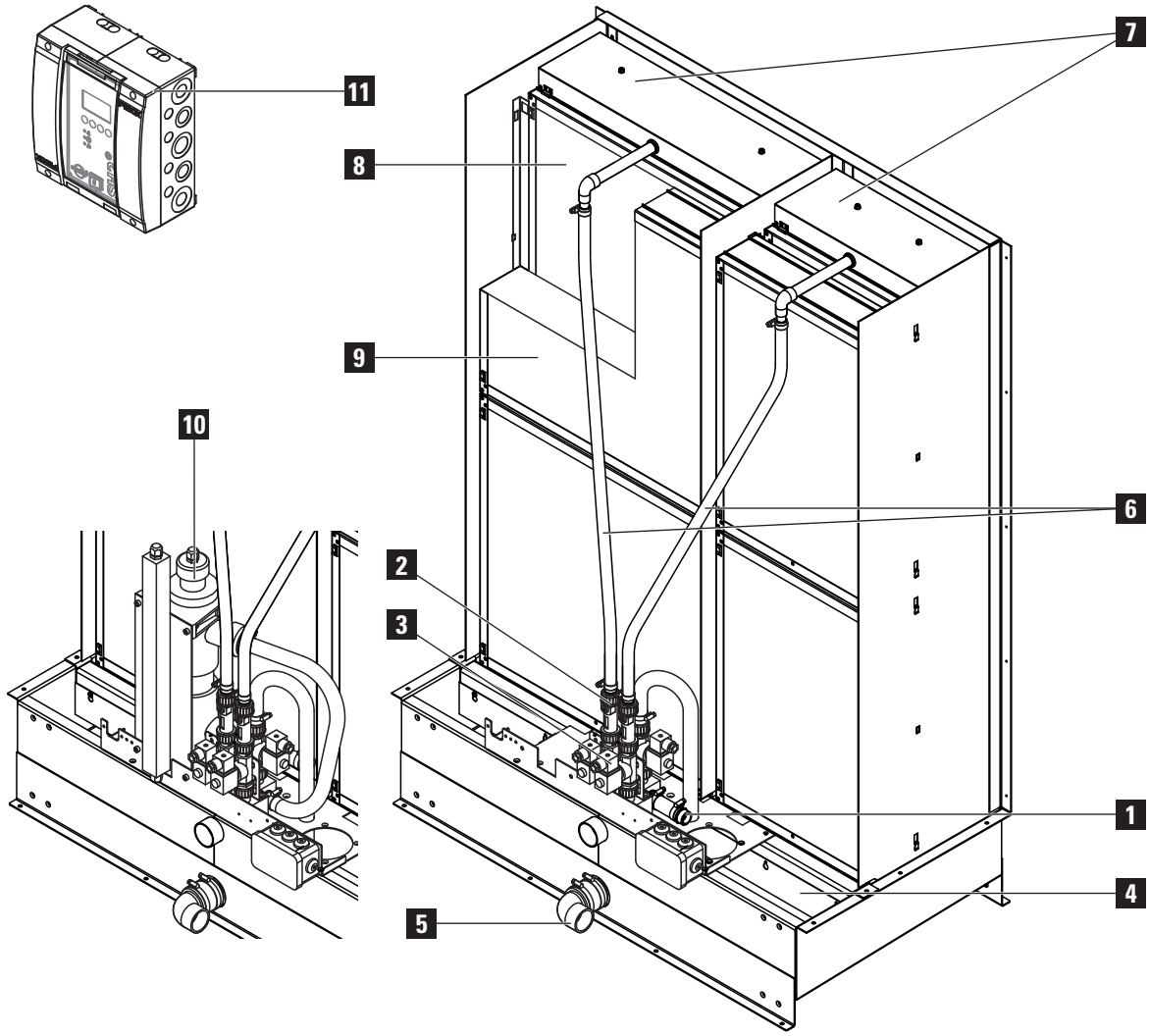
Functional description

The “flow C” model provides On/Off control by means of the RC control unit and an external On/Off humidistat. In case of a humidification/cooling request the supply valve opens and the water flows via the pressure reducing valve (accessory), the water filter (accessory) and the manually adjustable volume controlling valves to the distribution pipes above the humidification boxes.

The distribution pipes evenly supply the water to the entire surface of the humidification boxes where it flows down and humidifies the air flowing through the humidification boxes. The excess water not used for humidification flows to the water tub and then directly to the drain.

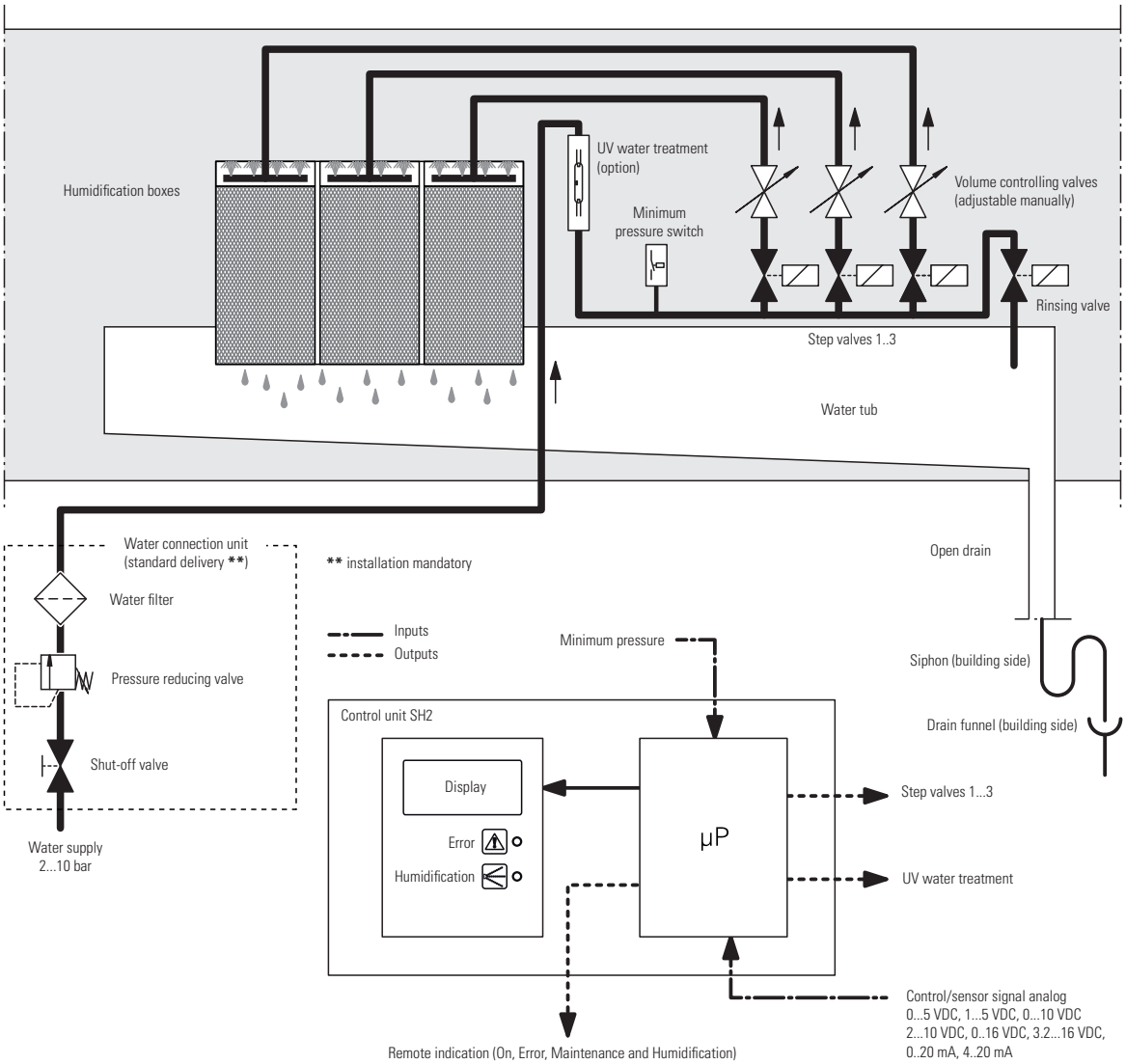
3.5 Model “flow SC”

3.5.1 Construction Model “flow SC”



1 Water connection on unit R 3/4" (outside thread)
2 Volume controlling valves (adjustable manually)
3 Step valves (1 to 3)
4 Water tub
5 Open drain (outside diameter 48 mm)
6 Water hoses
7 Trickling hoods with distribution pipes
8 Humidification boxes
9 Mist eliminator (for air speed above humidification boxes >3.5 m/s)
10 UV water treatment (option)
11 Control unit SH2

3.5.2 System overview model “flow SC”



Functional description

The “flow SC” model provides multistep control by means of the SH2 control unit and the step valves (1, 2 or 3 step valves depending on the humidifier capacity). The SH2 control unit (for wall mounting) processes analog sensor/control signals and uses them to control the step valves. This allows multistep control (1 to 3 steps depending on the humidifier capacity) which improves control accuracy compared to the “flow” model.

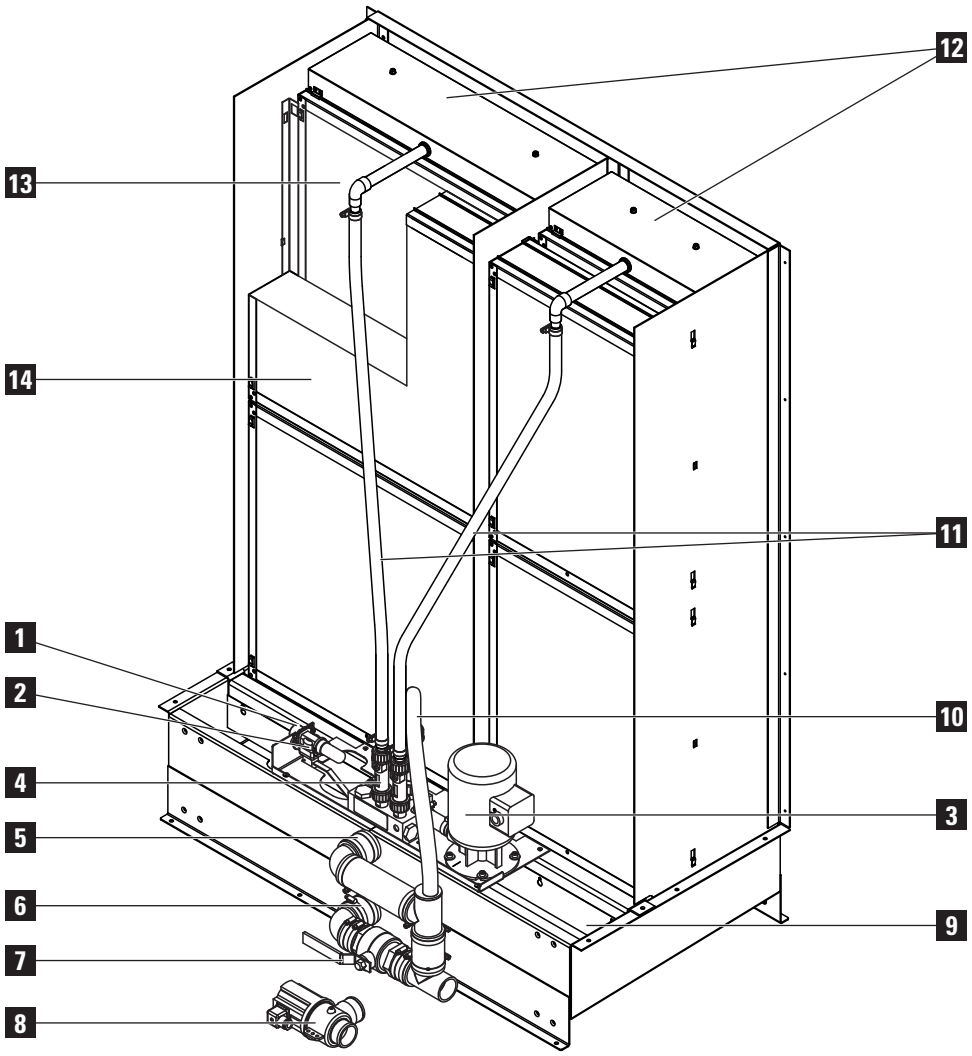
In case of a humidification/cooling request one, two or all three step valves open (depending on the request). The water flows via the manually adjustable volume controlling valves to the distribution pipes above the humidification boxes.

The distribution pipes evenly supply the water to the entire surface of the humidification boxes where it flows down and humidifies the air flowing through the humidification boxes. The excess water not used for humidification flows to the water tub and then directly to the drain.

If the “flow SC” model is equipped with the optional UV water treatment (installed in the water supply) the water is continuously degerminated during the humidification process.

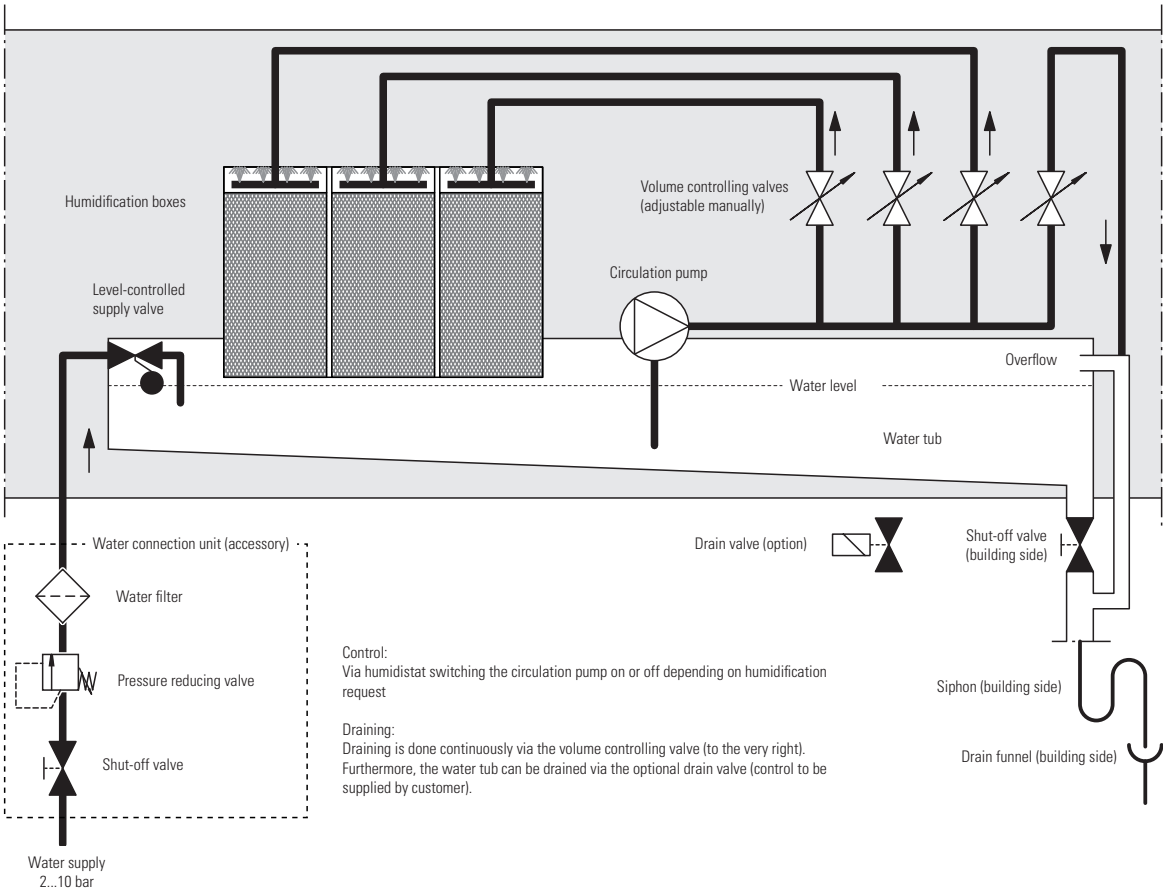
3.6 Model “REflow”

3.6.1 Construction model “REflow”



1 Water connection on unit R 3/4" (outside thread)
2 Level-controlled supply valve
3 Circulation pump
4 Volume controlling valves (adjustable manually)
5 Overflow
6 Drain
7 Shut-off valve
8 Drain valve (option)
9 Water tub
10 Drain line
11 Water hoses
12 Trickling hoods with distribution pipes
13 Humidification boxes
14 Mist eliminator (for air speed above humidification boxes >3.5 m/s)

3.6.2 System overview model “REflow”



Functional description

The water tub is filled up to a preset upper level via the level-controlled supply valve. When the water level in the tub drops below a certain limit, the level-controlled supply valve opens until the upper limit is reached again.

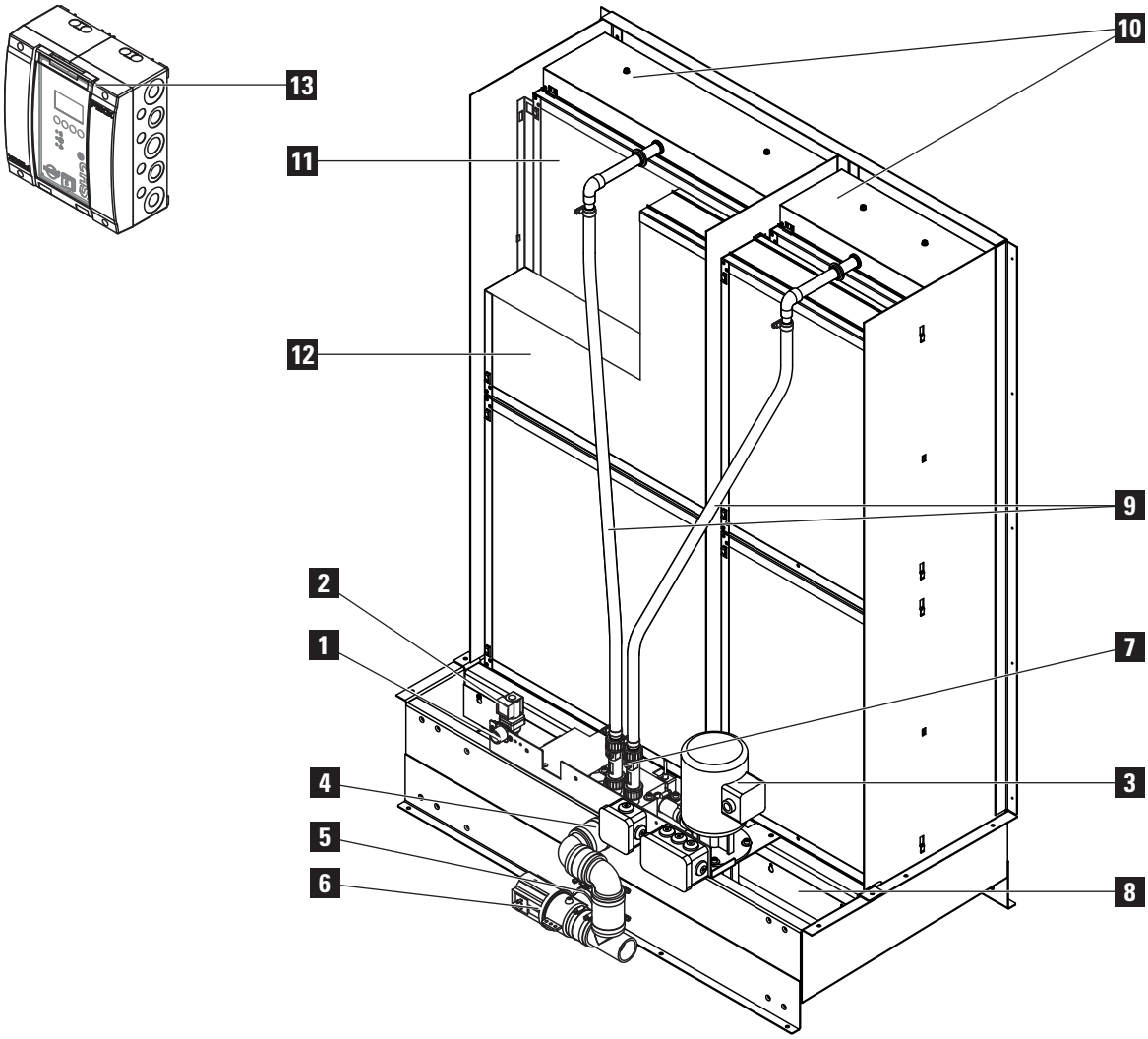
In case of a humidification/cooling request the circulation pump starts and supplies the water via the manually adjustable volume controlling valves to the distribution pipes above the humidification boxes.

The distribution pipes evenly supply the water to the entire surface of the humidification boxes where it flows down and humidifies the air flowing through the humidification boxes. The excess water not used for humidification flows to the water tub and is fed back to the circulation pump.

To prevent accumulation of mineral residues in the water tub, a limited amount of water is continuously drained via a manually adjustable volume controlling valve and replaced with fresh water.

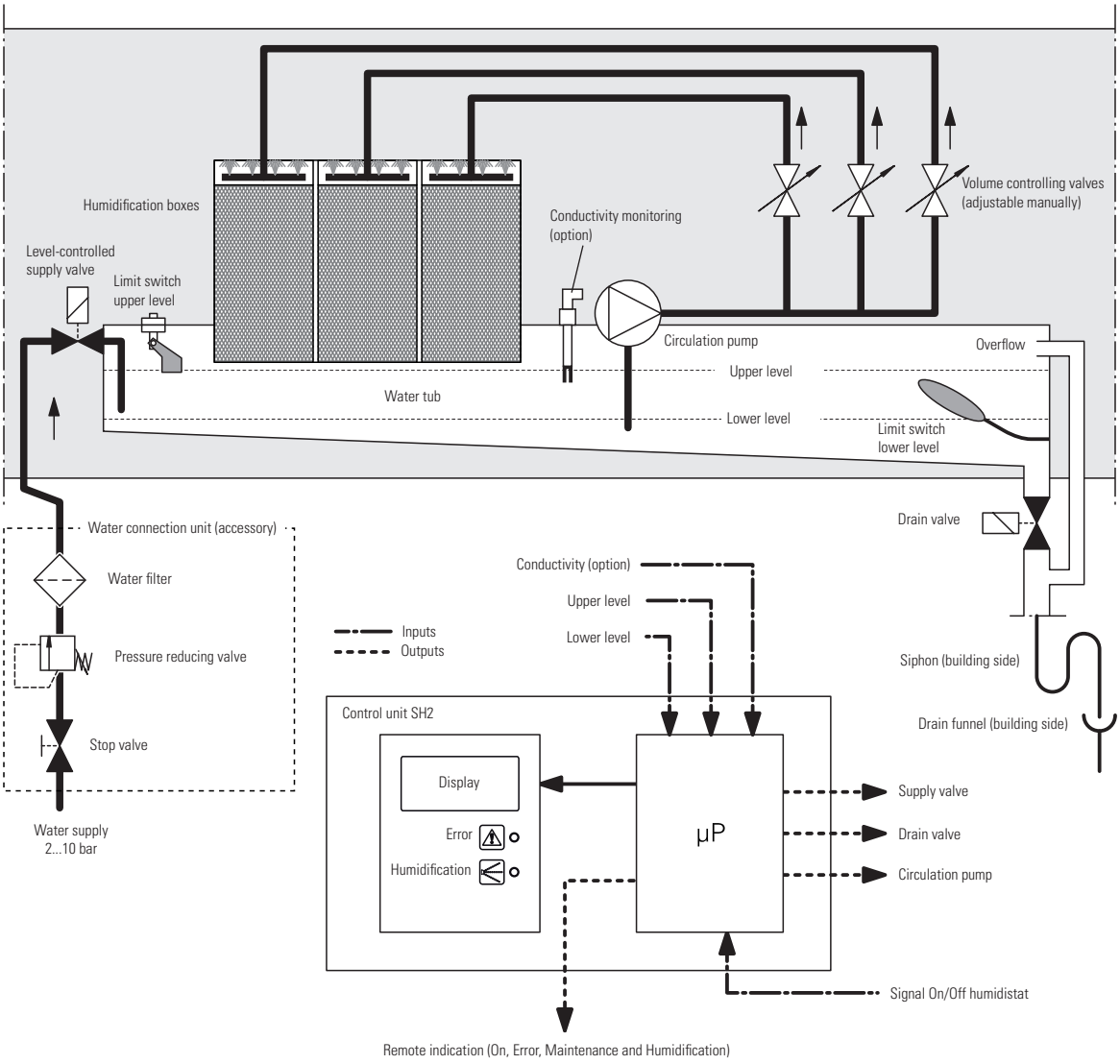
3.7 Model “REflow C”

3.7.1 Construction model “REflow C”



1 Water connection on unit R 3/4" (outside thread)
2 Level-controlled supply valve
3 Circulation pump
4 Overflow
5 Drain
6 Drain valve
7 Volume controlling valves (adjustable manually)
8 Water tub
9 Water hoses
10 Trickling hoods with distribution pipes
11 Humidification boxes
12 Mist eliminator (for air speed above humidification boxes >3.5 m/s)
13 Control unit SH2

3.7.2 System overview model “REflow C”



Functional description

The water tub is filled up to a preset upper level via the level-controlled supply valve. When the water level in the tub drops below a certain limit, the level-controlled supply valve opens until the upper limit is reached again.

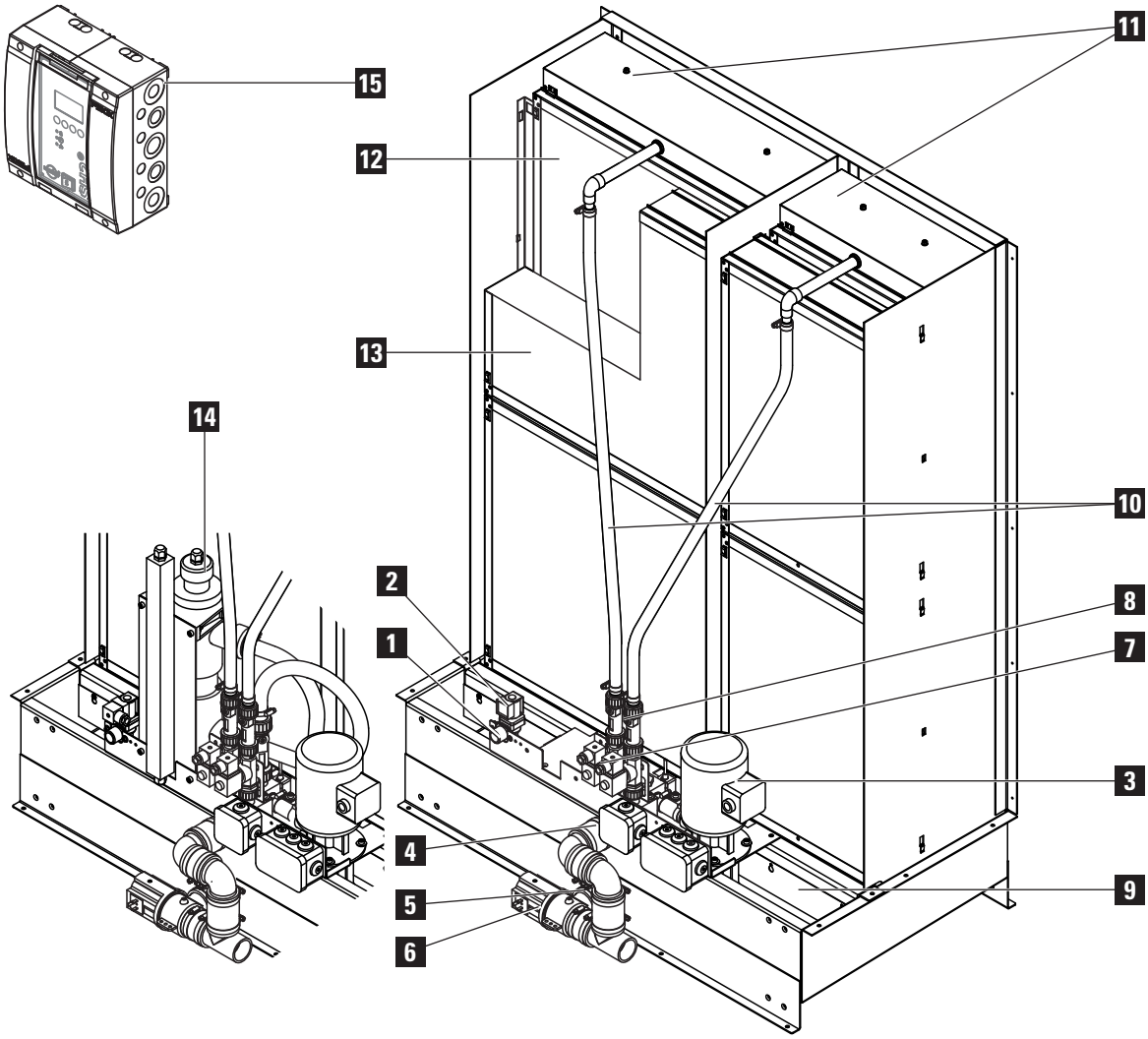
The “REflow C” model provides On/Off control by means of the SH2 control unit and an external On/Off humidistat. In case of a humidification/cooling request one, two or all three step valves open (depending on the request). The water flows via the manually adjustable volume controlling valves to the distribution pipes above the humidification boxes.

The distribution pipes evenly supply the water to the entire surface of the humidification boxes where it flows down and humidifies the air flowing through the humidification boxes. The excess water not used for humidification flows to the water tub.

To prevent accumulation of mineral residues and the formation of germs in the water tub, the tub is completely drained periodically (interval or time controlled). Additionally further hygiene functions can be activated: Operation-dependent draining of the water tub (conductivity or fill cycle controlled) as well as cleaning and drying of the humidification boxes.

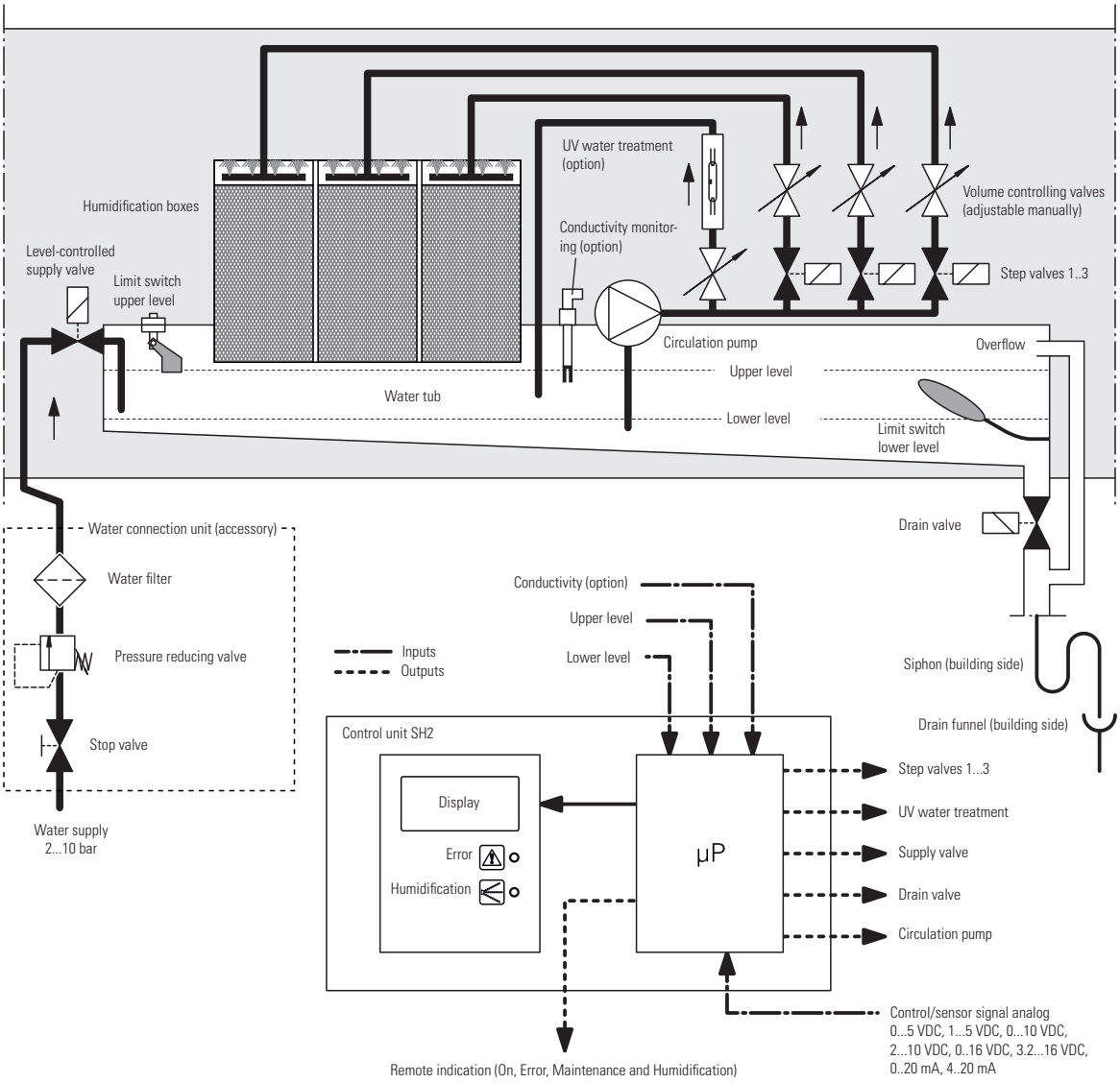
3.8 Model “REflow SC”

3.8.1 Construction model “REflow SC”



1 Water connection on unit R 3/4" (outside thread)
2 Level-controlled supply valve
3 Circulation pump
4 Overflow
5 Drain
6 Drain valve
7 Step valves (1 to 3)
8 Volume controlling valves (adjustable manually)
9 Water tub
10 Water hoses
11 Trickling hoods with distribution pipes
12 Humidification boxes
13 Mist eliminator (for air speed above humidification boxes >3.5 m/s)
14 UV water treatment (option)
15 Control unit SH2

3.8.2 System overview model “REflow SC”



Functional description

The water tub is filled up to a preset upper level via the level-controlled supply valve. When the water level in the tub drops below a certain limit, the level-controlled supply valve opens until the upper limit is reached again.

The “REflow SC” model provides multistep control by means of the SH2 control unit and the step valves (1, 2 or 3 step valves depending on the humidifier capacity). The SH2 control unit (for wall mounting) processes analog sensor/control signals and uses them to control the step valves. This allows multistep control (1 to 3 steps depending on the humidifier capacity) which improves control accuracy compared to the “REflow” model.

In case of a humidification/cooling request the circulation pump starts and one, two or all three step valves open (depending on the request). The water flows via the manually adjustable volume controlling valves to the distribution pipes above the humidification boxes.

The distribution pipes evenly supply the water to the entire surface of the humidification boxes where it flows down and humidifies the air flowing through the humidification boxes. The excess water not used for humidification flows to the water tub.

To prevent accumulation of mineral residues and the formation of germs in the water tub, the tub is completely drained periodically (Interval or time controlled). Additionally further hygiene functions can be activated: Operation-dependent draining of the water tub (conductivity or fill cycle controlled) as well as cleaning and drying of the humidification boxes.

If the "REflow SC" model is equipped with the optional UV water treatment, a particular amount of water is led to the UV water treatment unit where it is degerminated.

3.8 Standard delivery

The standard delivery includes:

- Adiabatic air humidifier Condair SH2 according type designation (delivered apart) equipped with options according delivery note.
- Ordered accessories with operating instructions, packed separately.
- Installation and operating instructions (this document)
- Operating instructions control unit SH2 (models with control unit SH2 only)
- Spare parts list

3.9 Storing/Transport/Packaging

Storing

Store the unit and unit components in a protected area meeting the following requirements:

- room temperature: 1 ... 40 °C
- room humidity: 10 ... 75 %rh

Transport

For optimum protection always transport the unit and the unit components in the original packaging.

The weight of the unit components depends on the unit model. To transport bigger unit components always ask a second person for assistance.

Packaging

Keep the original packaging of the Condair SH2 for later use.

In case you wish to dispose of the packaging, observe the local regulations on waste disposal. Never dispose of the packaging to the environment.

4 Installation

4.1 Important notes on the mounting and installation work

Qualification of personnel

All mounting and installation work must be carried out only by **well qualified personnel authorised by the owner**. It is the owner's responsibility to verify proper qualification of the personnel.

General note

Strictly observe and comply with all information given in the present installation and operating instructions regarding the mounting of the unit and the installation of water and electricity.

Observe and comply with all local regulations dealing with water and electrical installations.

Safety

The electrical installation for the unit models flow C, flow SC, REflow C and REflow SC requires the removal of the control unit cover. Please note the following:

⚠ **DANGER!**	**Danger of electrical shock! You may get in touch with live parts when the control unit is open. The control unit must be connected to the mains only after all mounting and installation work has been completed and the control unit cover has been relocated properly.**

CAUTION!	The **electronic components** inside the control unit are **very sensitive to electrostatic discharge**. When the unit is open for installation work, appropriate measures must be taken to **protect these components against damage caused by electrostatic discharge (ESD protection)**.

4.2 Unit mounting

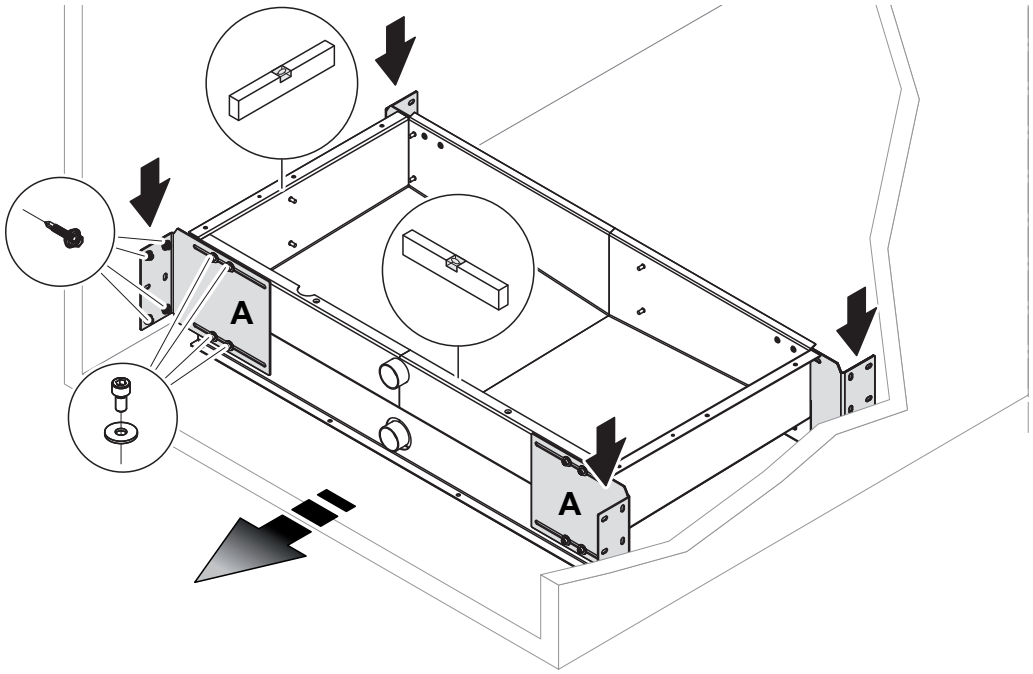
4.2.1 Note on locating the unit

Usually, the design and dimensioning of the ventilation duct/monobloc as well as the location of the Condair SH2 inside the duct are determined, recorded and set compulsory when planning the entire system. Prior to installation, however, make sure the following criteria have been taken into consideration:

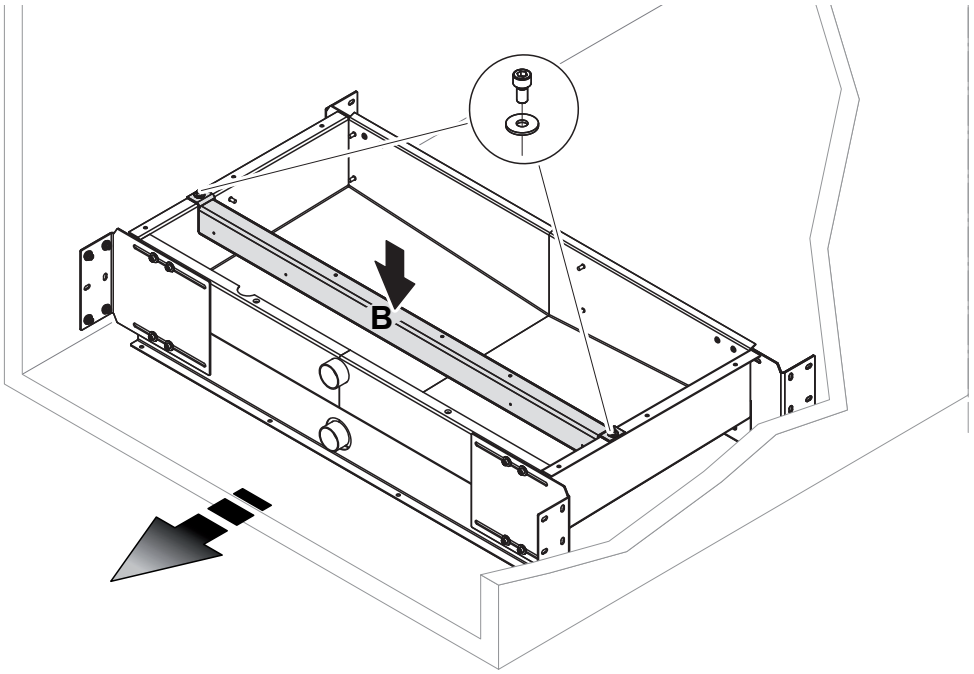
- For operation with fully demineralised water: Fully demineralised water is aggressive! For this reason, all components located close to the humidification unit (duct/monobloc, fastening material, drain pipe, etc.) must be made of corrosion-proof steel (minimum requirements according to DIN 1.4301) or plastic.
- For installation and maintenance of the humidification unit a viewing window and a sufficiently large maintenance door must be available in the duct/monobloc.
- In the area of the humidification unit the ventilation duct/monobloc must be waterproof.
- Important! An air filter must be installed at the air inlet of the humidification unit. The filter must meet the quality standards F7 (EU7) or better.
- In case of low ambient temperature the duct must be insulated to prevent the moist air from condensing inside the duct.

– If the system is equipped with a heater, make sure it is at least 0.5 m away from the humidification unit.
– If silencers are mounted in the airconditioning units make sure to locate the humidification unit at a minimum distance of 3 m before or after the silencers.
– In order to avoid drops seeping over the humidification boxes, an even air flow over the full cross section of the humidification unit must be guaranteed. If necessary, rectifiers or perforated plates must be installed on the building side before the humidifier.
  If the air velocity above the humidification boxes exceeds 3.5 m/s, mist eliminator must be installed.
– The effective height of the siphon in the drain line depends on the duct pressure. Correct dimensioning of the siphon is the customer's responsibility.

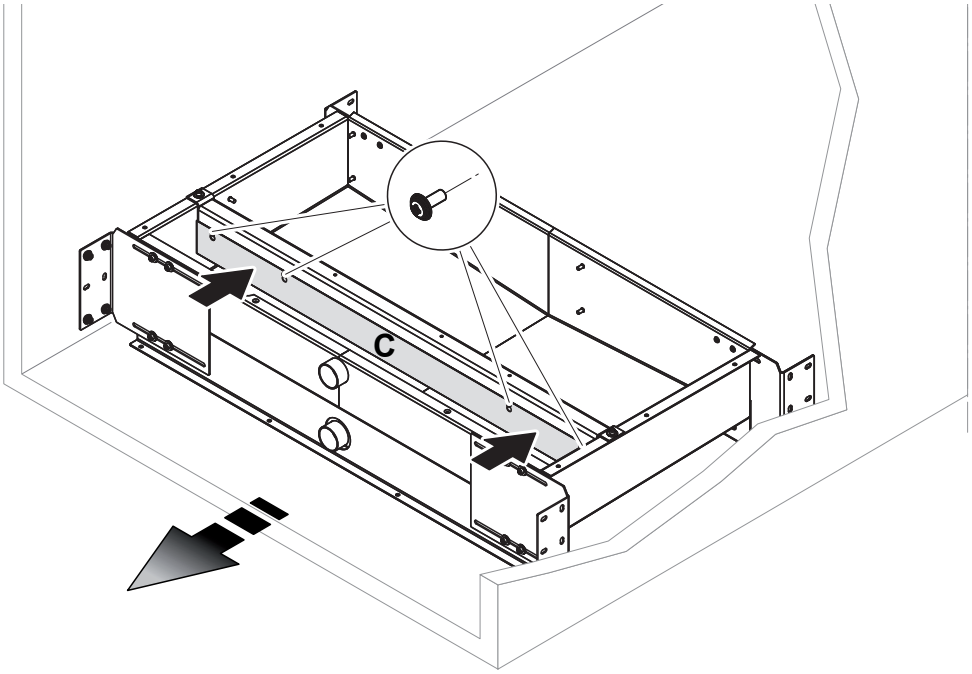
4.2.2 Mounting process



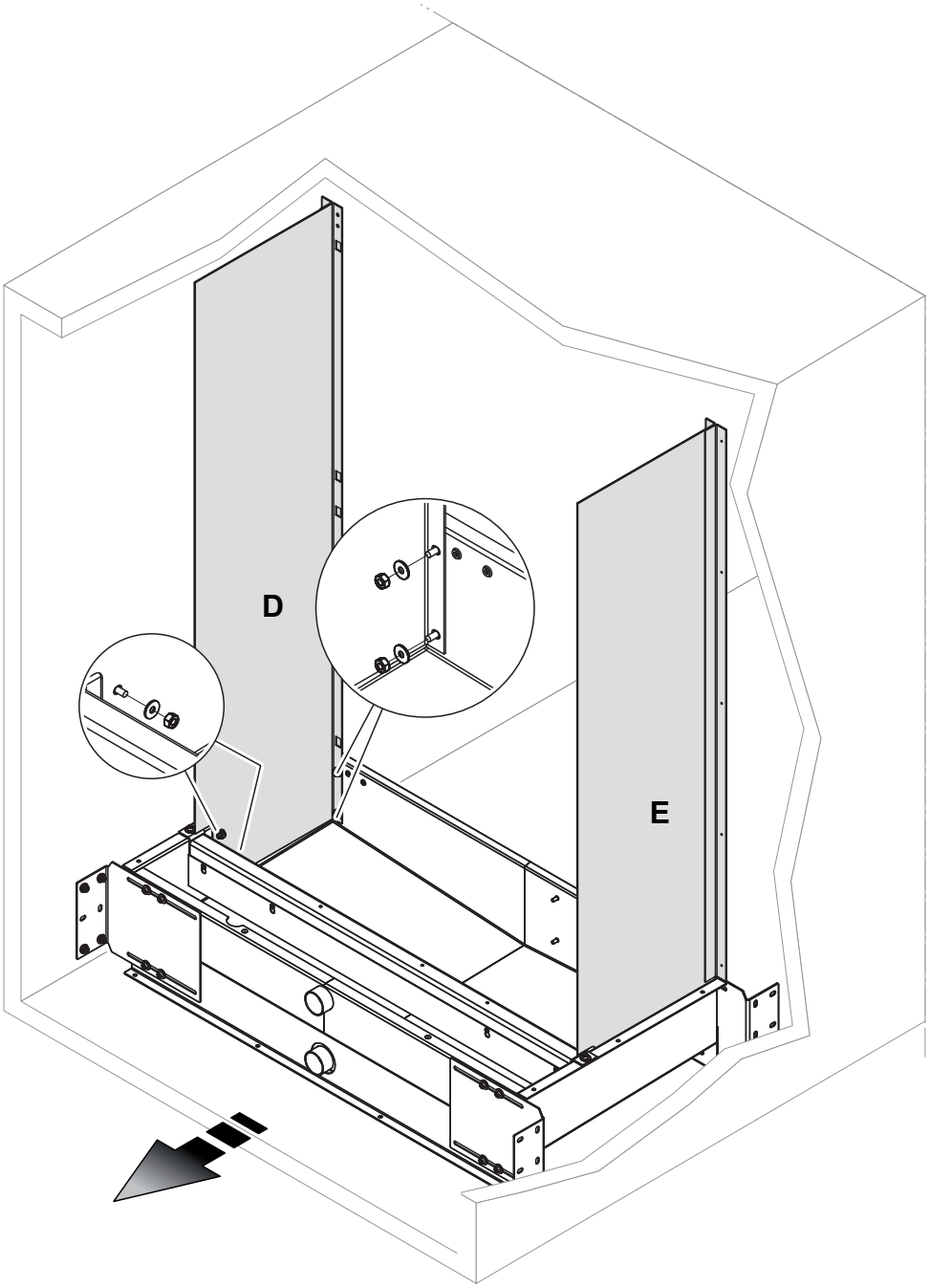
1. Fix the four mounting brackets "**A**" to the water tub using four screws M6x12 and washers for each bracket. Align the water tub to the centre of the duct, then use the spirit level to adjust the water tub to the duct lengthwise and crosswise. When adjusted, fix the mounting brackets to the duct wall using four self-tapping screws 6.3x25.



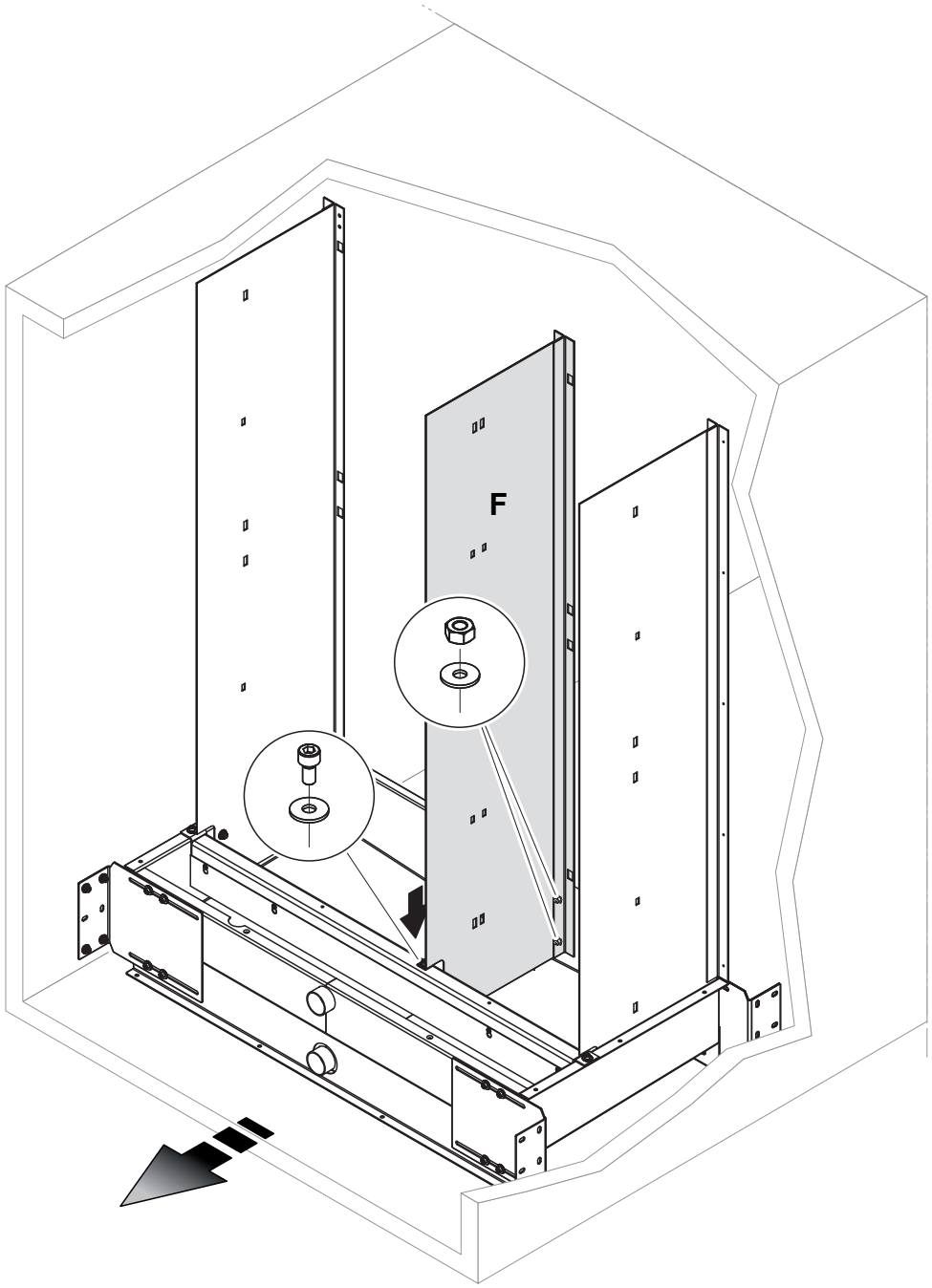
2. Fix the cross beam "**B**" (the threads in the vertical surface of the cross beam must be on the side of the tub drain) to the water tub using two hexagon socket screws M6x12 and washers.



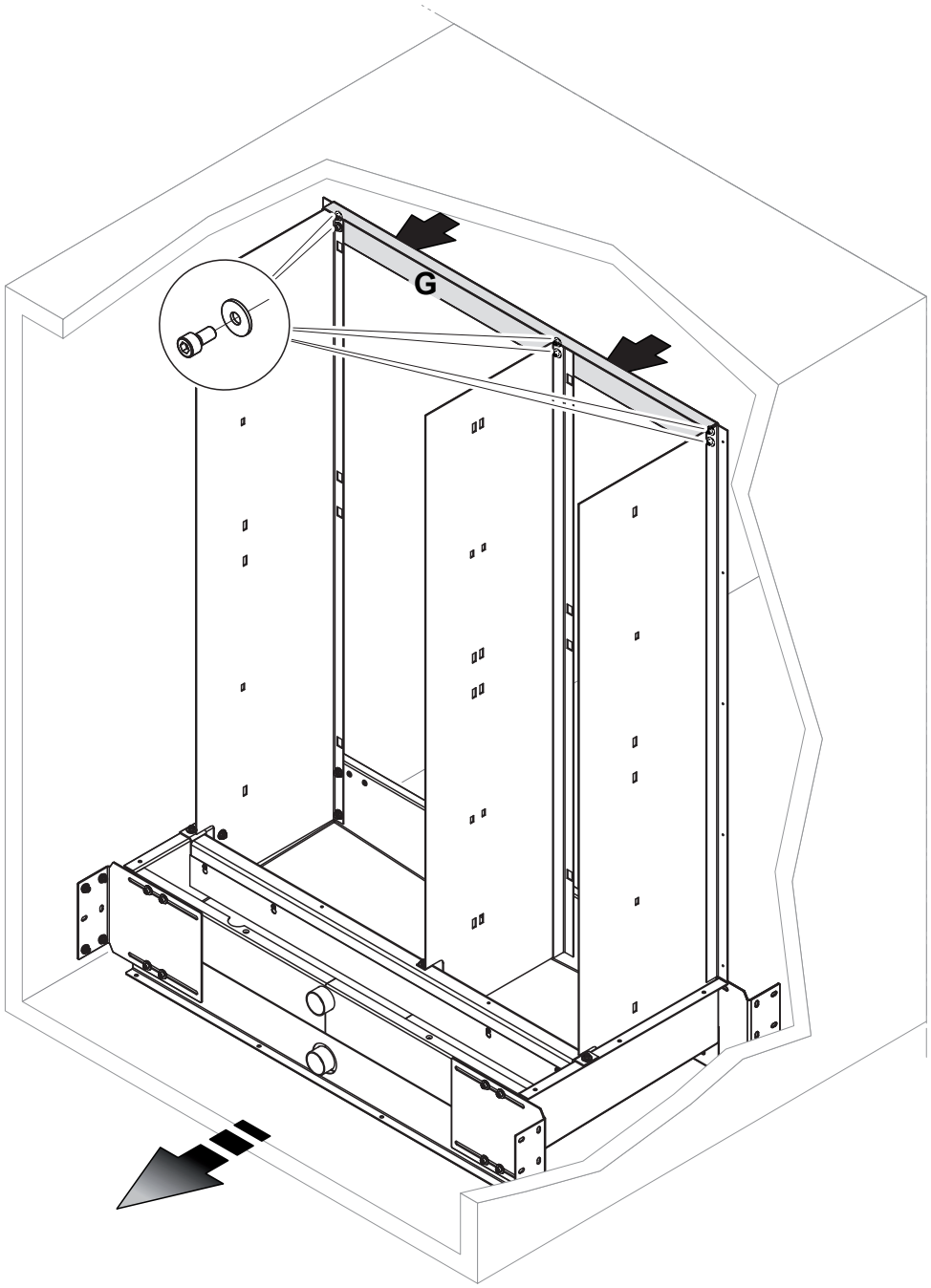
3. Screw lens head screws M4x10 approx. two turns into each threaded hole of the cross beam. Hang up the stop sheet "**C**" on the screws, then tighten the screws.



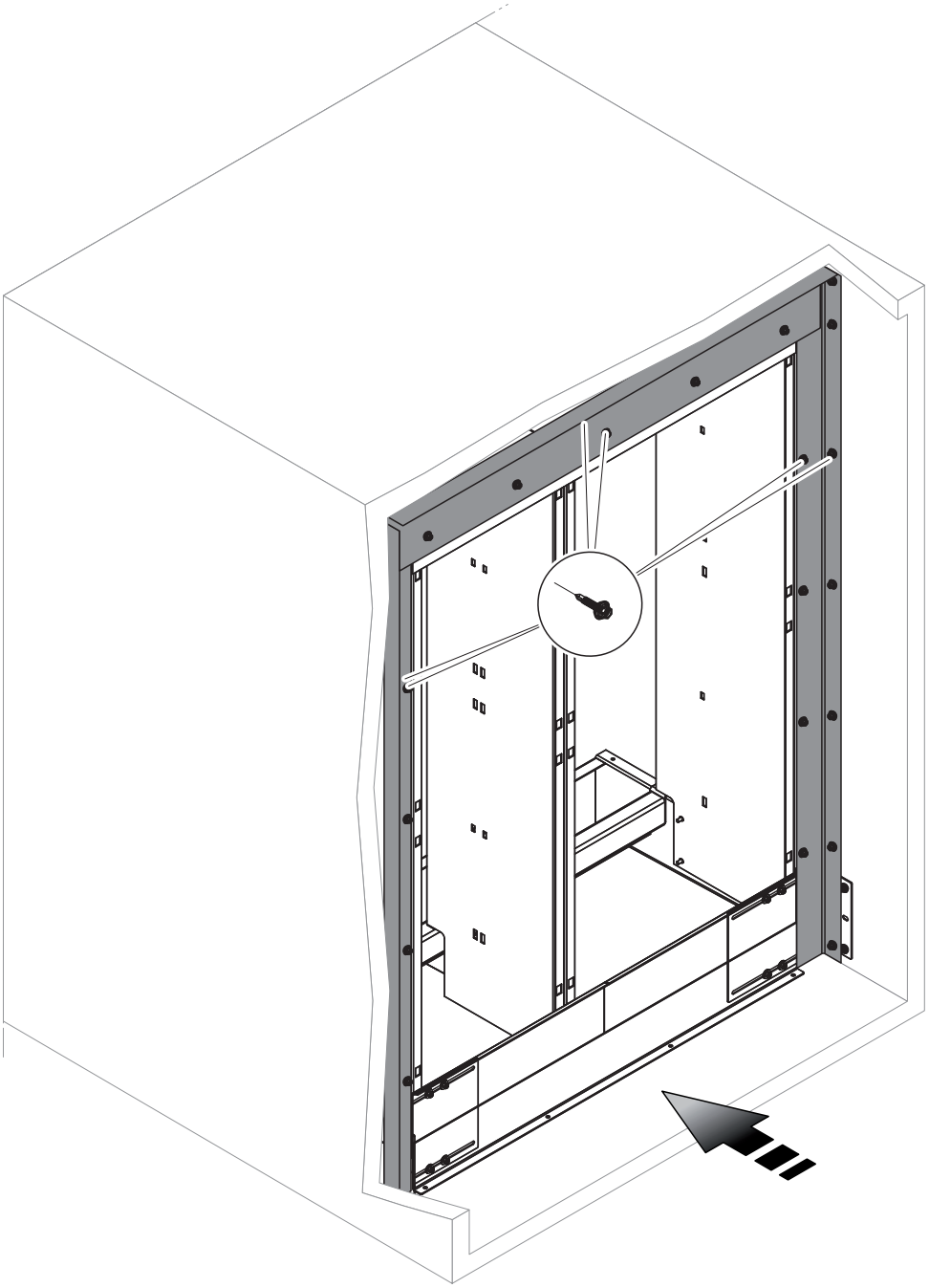
4. **Carefully** mount the left "**D**" and the right vertical support "**E**" onto the threaded bolts of the water tub, then fix each support with four nuts M6 and washers (do not overtighten the nuts).



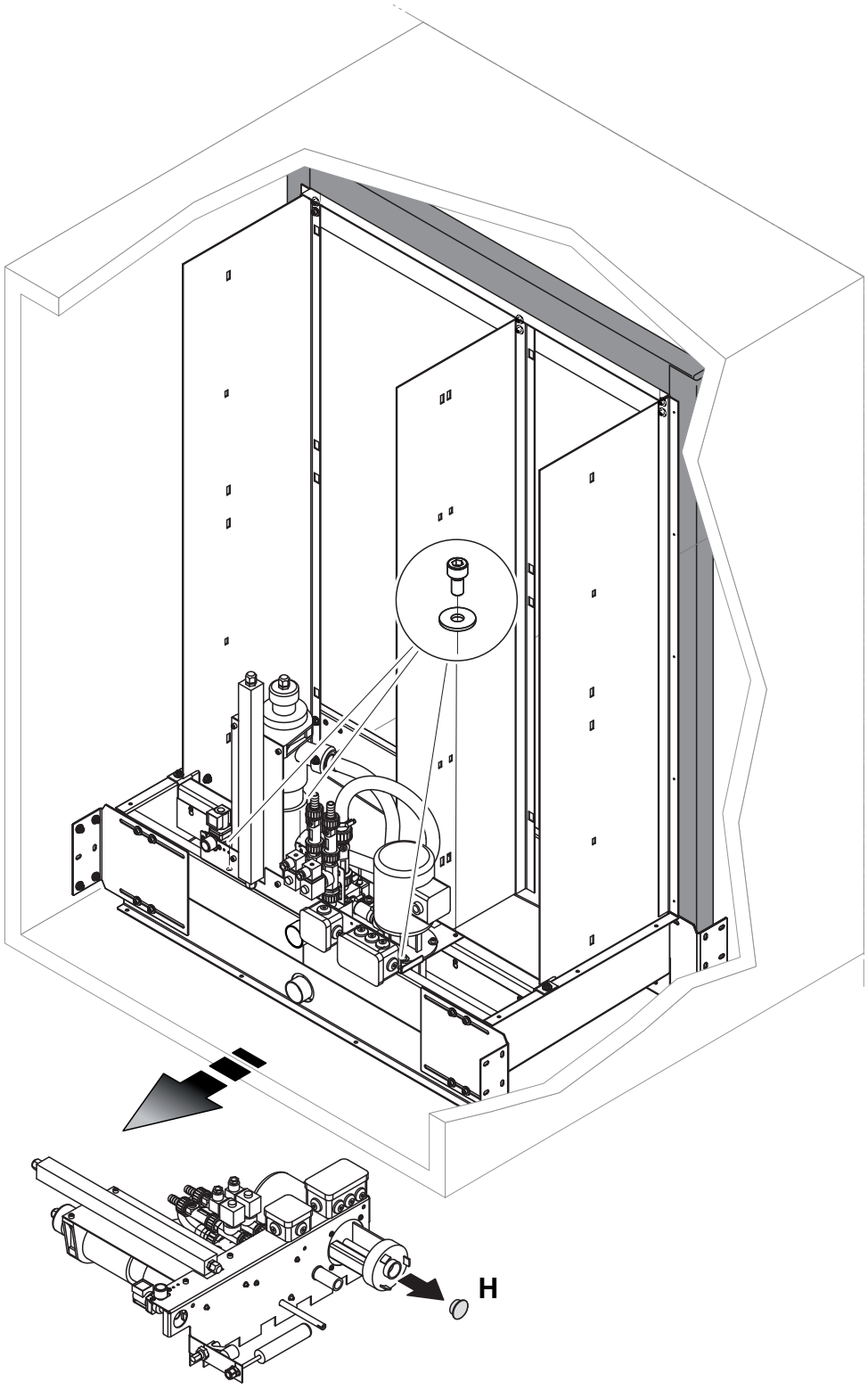
5. **Carefully** mount the vertical intermediate support(s) "**F**" (number depending on the unit size) onto the threaded bolts of the water tub, then fix each support with two nuts M6 and washers to the water tub (do not overtighten the nuts) and with a hexagon socket screw M6x12 and a washer to the cross beam.



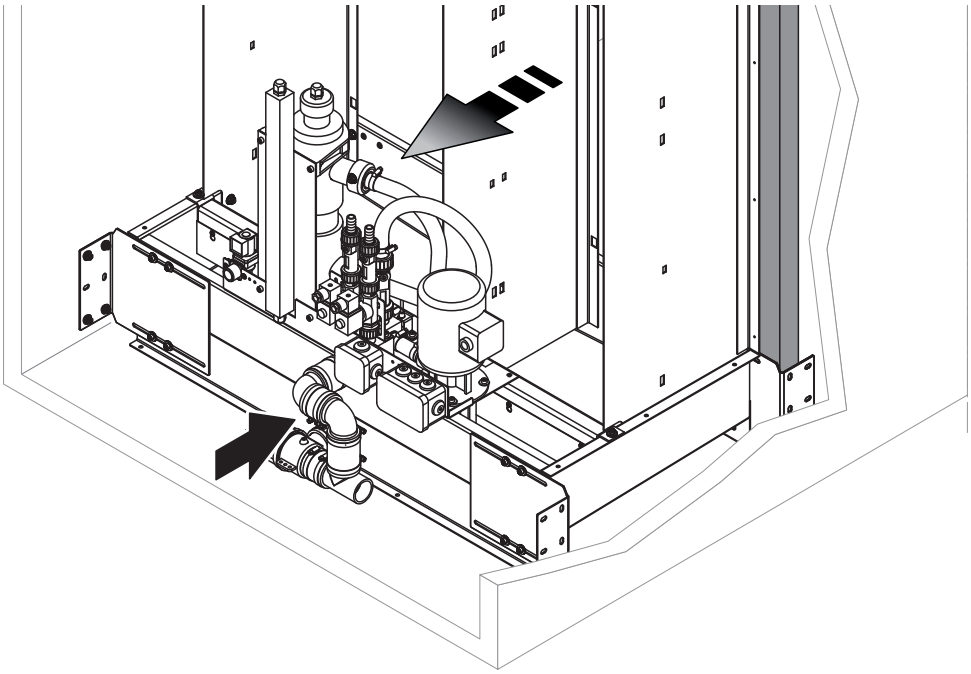
6. Fix the front bracket "**G**" to each vertical support using two hexagon socket screws M6x12 and washers.

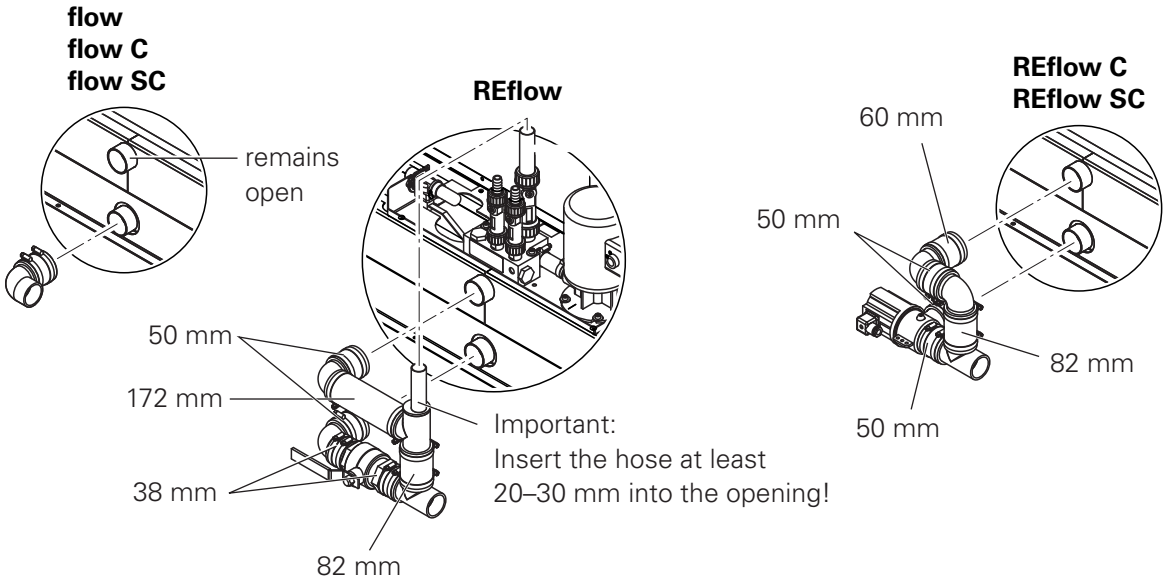


7. The air gap between the outermost supports and the duct walls as well as between the front bracket and the duct ceiling must be sealed using angle sheets made of stainless steel (not included in the delivery) or EPDM sealing profile (accessory).
   Note: The figure above shows the sealing with EPDM sealing profiles, which are fixed to the duct and to the supports and the front bracket with self-tapping screws 6.3x25.

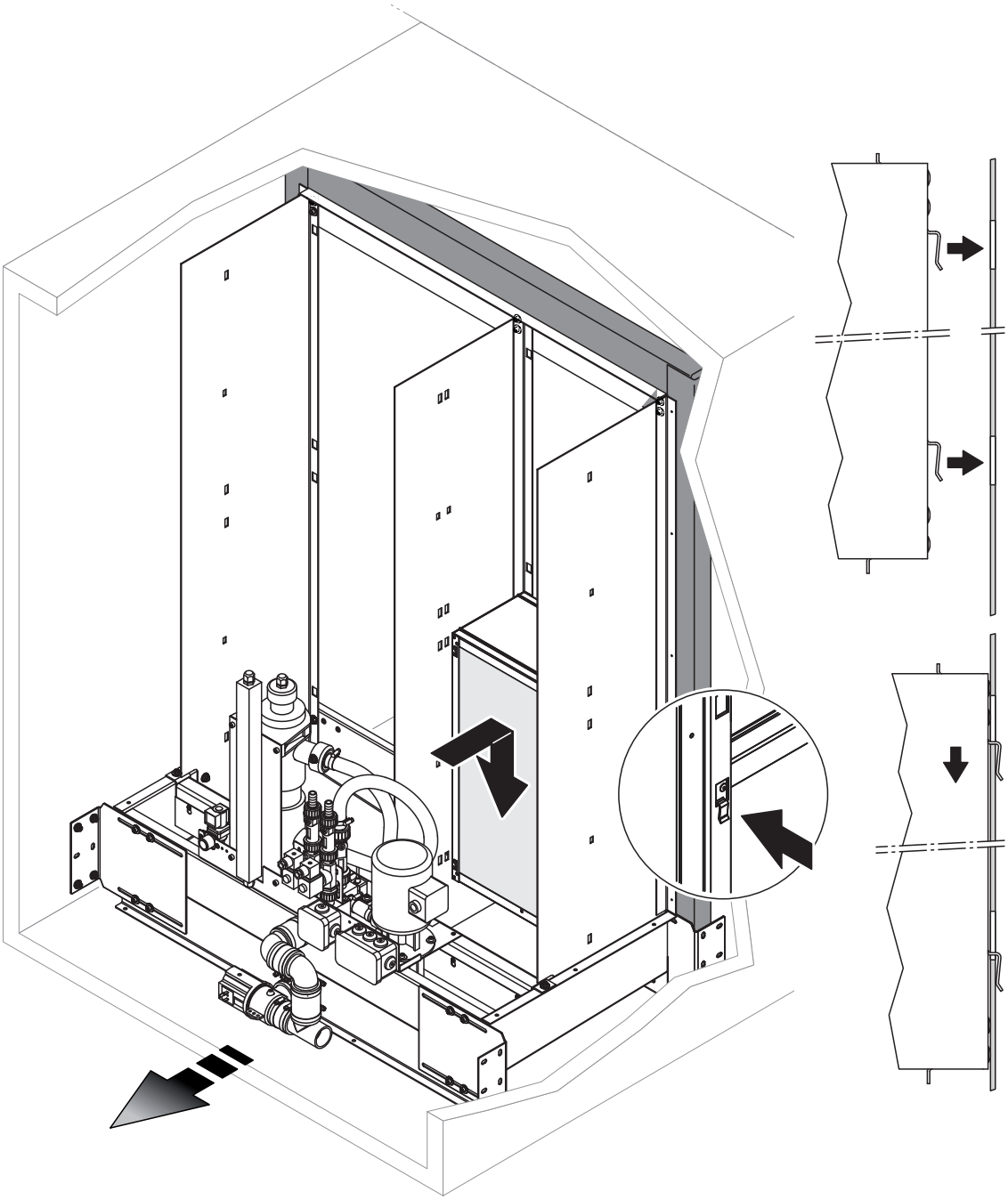


8. Fix hydraulic unit to the water tub and the cross beam using four hexagon socket screws M6x12 and washers.
   Important: **Remove the closing plug "H" from the circulation pump inlet** before mounting the hydraulic units REflow, REflow C or REflow SC.

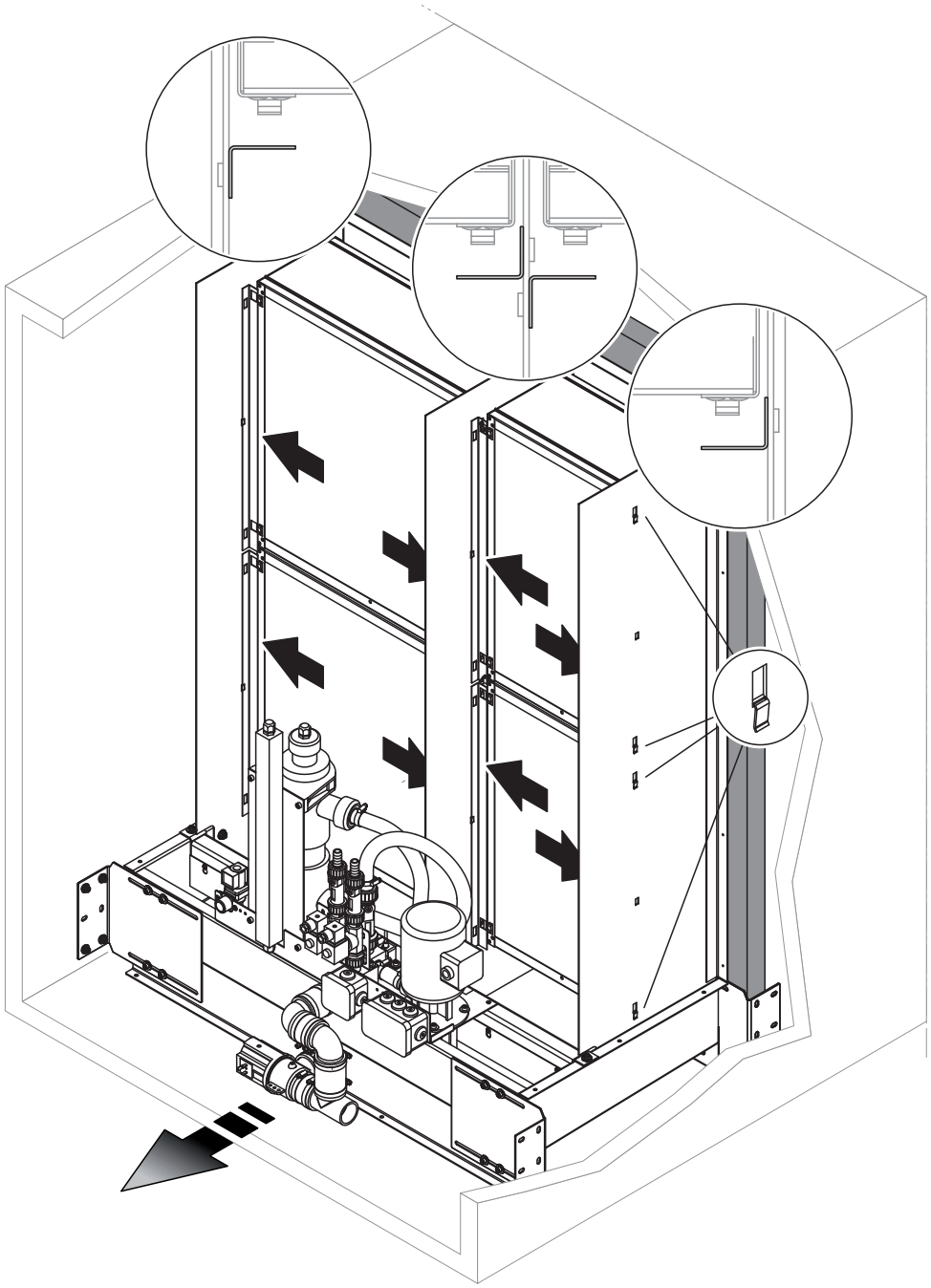




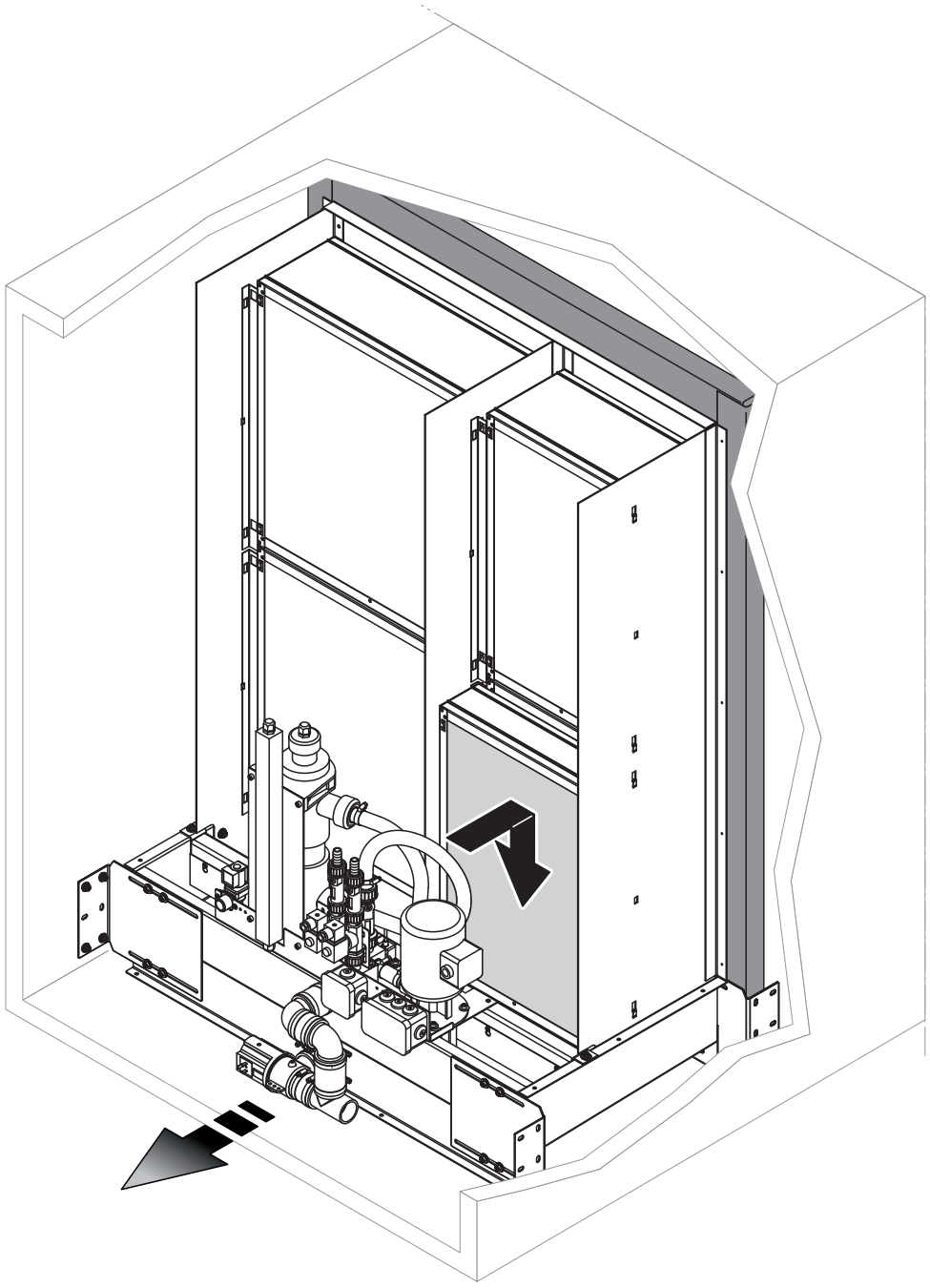
9. Assemble the drains according to the corresponding figure above (the drains can be assembled for draining to the right or to the left) and fix it to the connector(s) of the water tub. Fasten all hose clamps (2 clamps per hose).



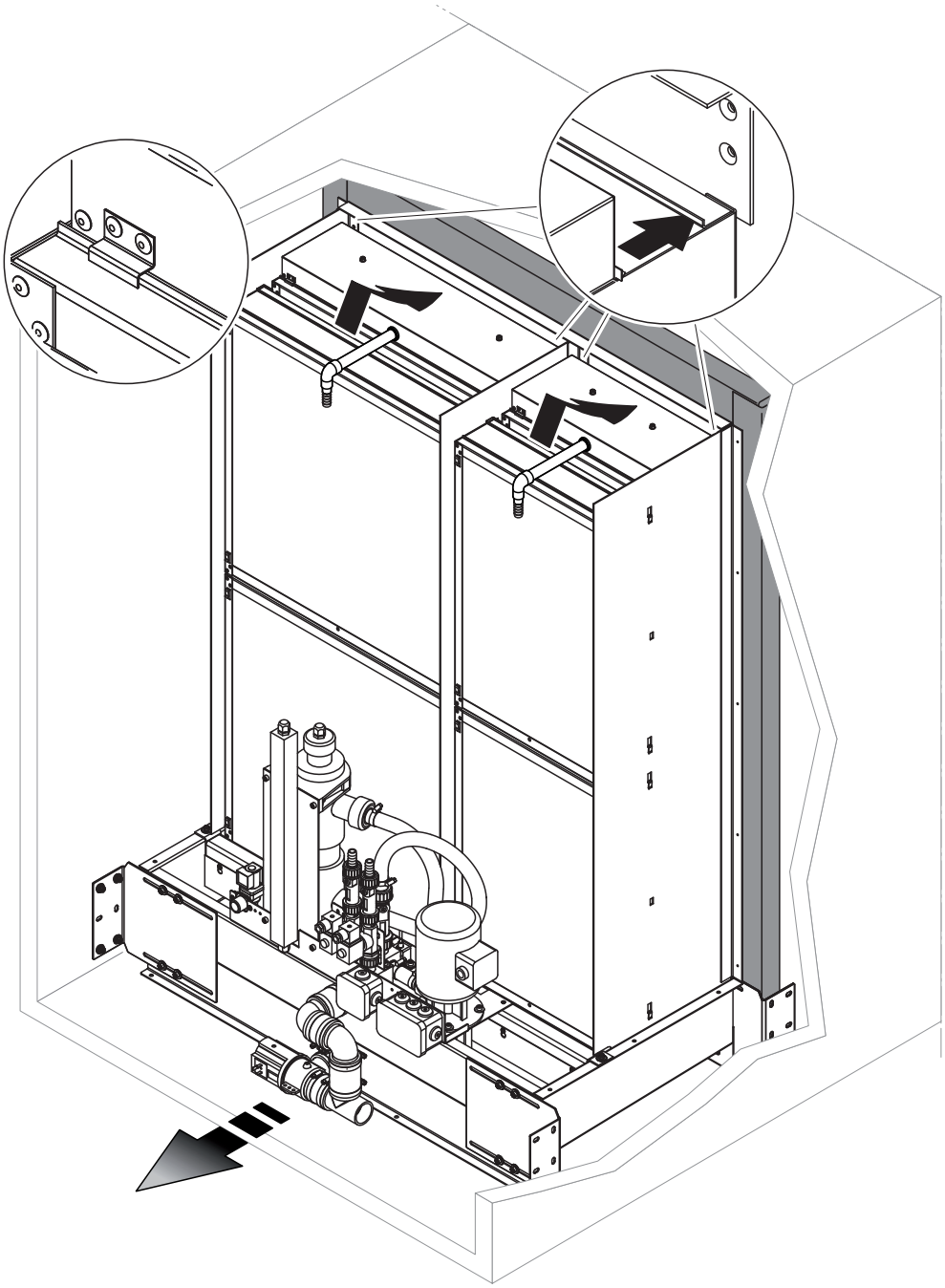
10. Starting from the bottom, install the humidification boxes in each row: Hook the mounting clips of the boxes into the corresponding openings of the supports, then push the humidification box downwards until it comes to a stop.
    Note: arrangement of the humidification boxes according to the installation drawing included in the delivery.



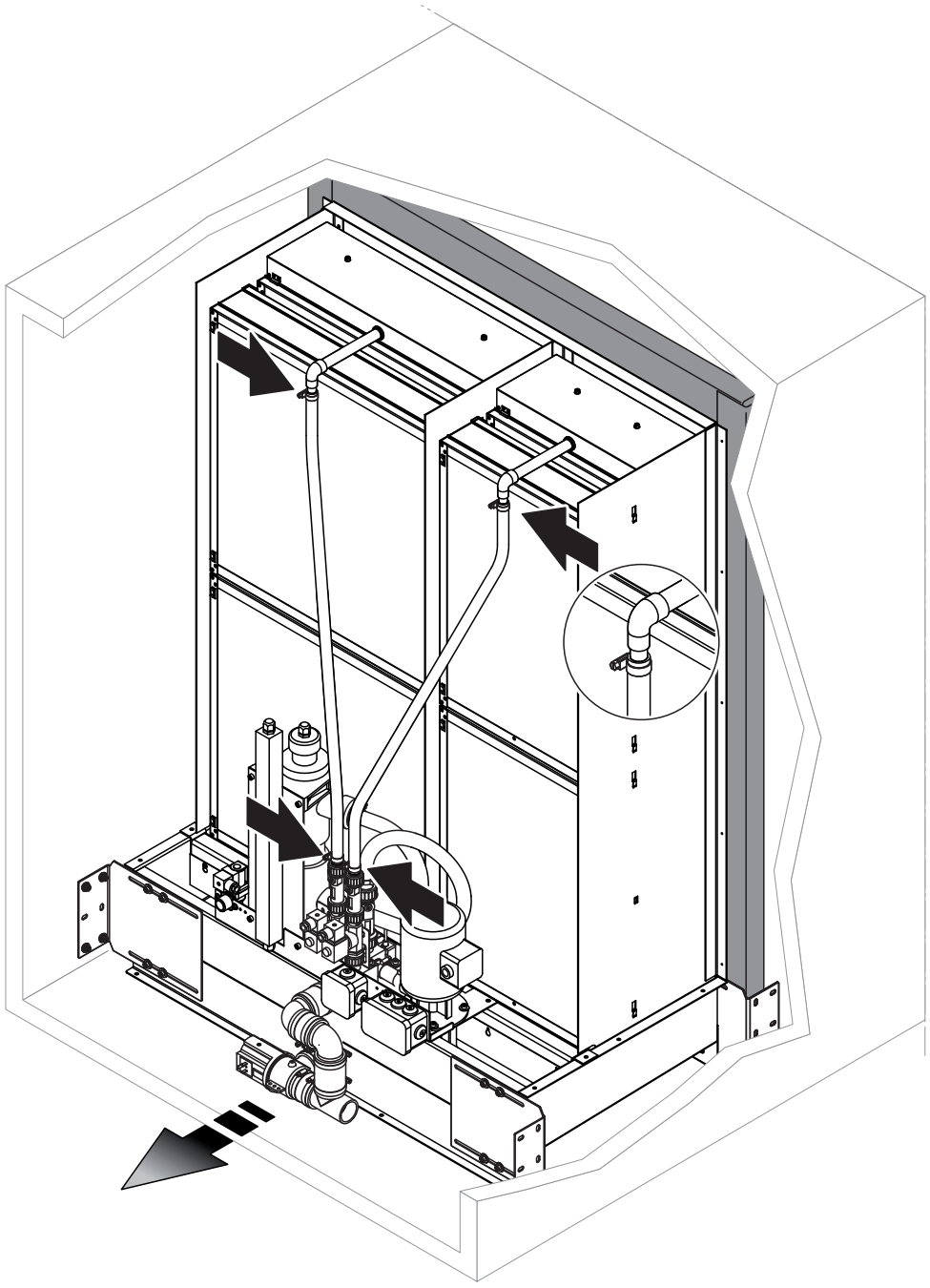
11. **Only for units with mist eliminator:** Hook the mounting brackets into corresponding openings of the vertical supports, then push the brackets downwards until it comes to a stop (if necessary use a rubber mallet).
    Note: arrangement of the mounting brackets according to the detail figures above and the installation drawing included in the delivery.



12. **Only for units with mist eliminator:** Starting from the bottom, install the mist eliminator in each row: Hook the mounting clips of the mist eliminator into the corresponding openings of the mounting brackets, then push the mist eliminator downwards until it comes to a stop.
    Note: arrangement of the mist eliminator according to the installation drawing included in the delivery.



13. Mounting the trickling hoods: Push the two tongues on the back side of the trickling hood underneath the frame sheet of the humidification box (see detail above), then flap the trickling hood downwards. The two brackets on the front side of the trickling hood must engage in the frame (see detail above) of the humidification box.
    Note: arrangement of the trickling hoods according to the installation drawing included in the delivery.

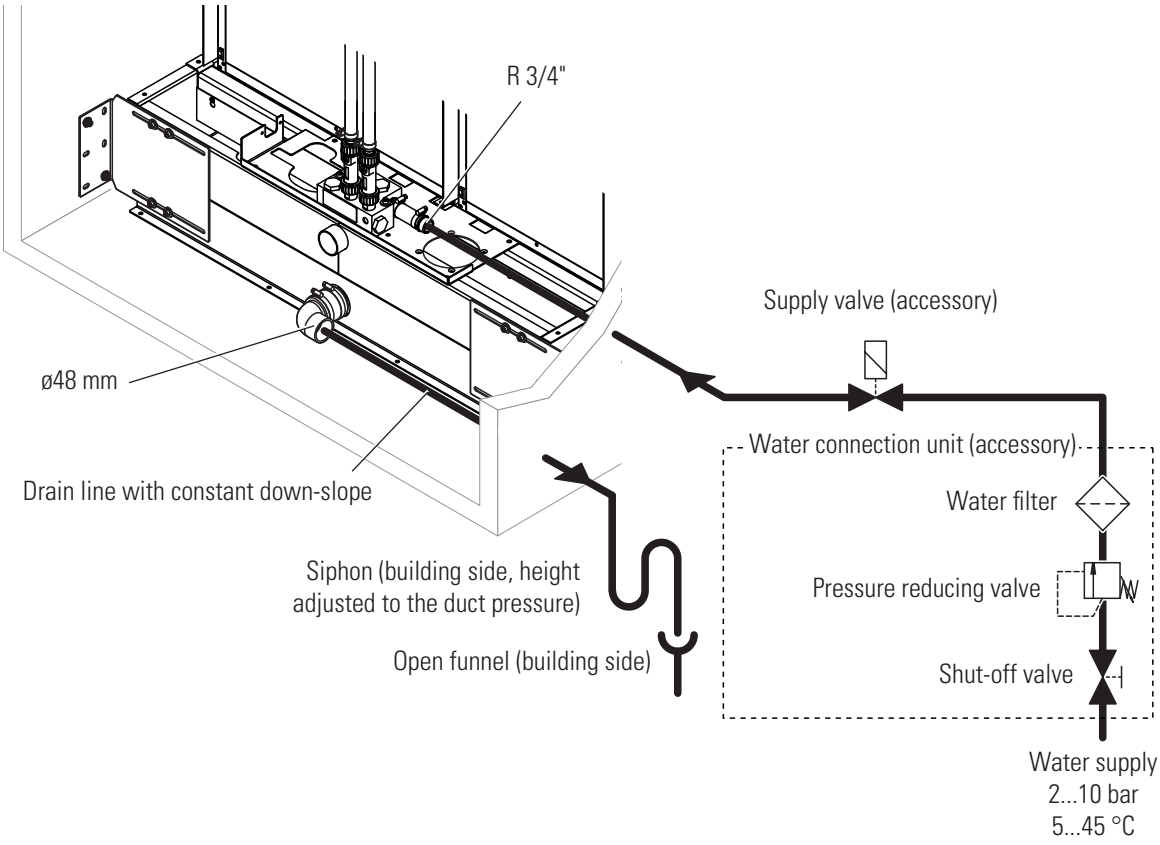


14. Connect water hoses to the connectors on the trickling hoods and the volume controlling valves and fix them with the hose clamps.
    Note: arrangement of the water hoses according to the installation drawing included in the delivery.

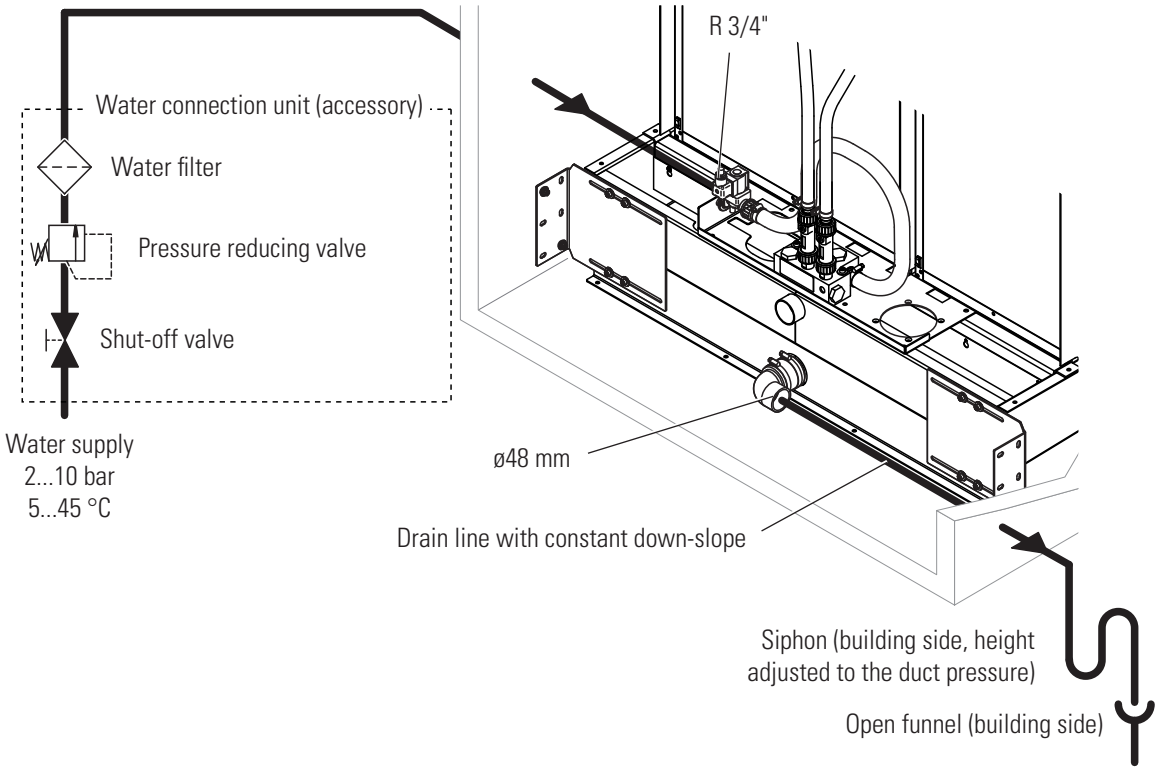
4.3 Water installation

4.3.1 Overviews water installation

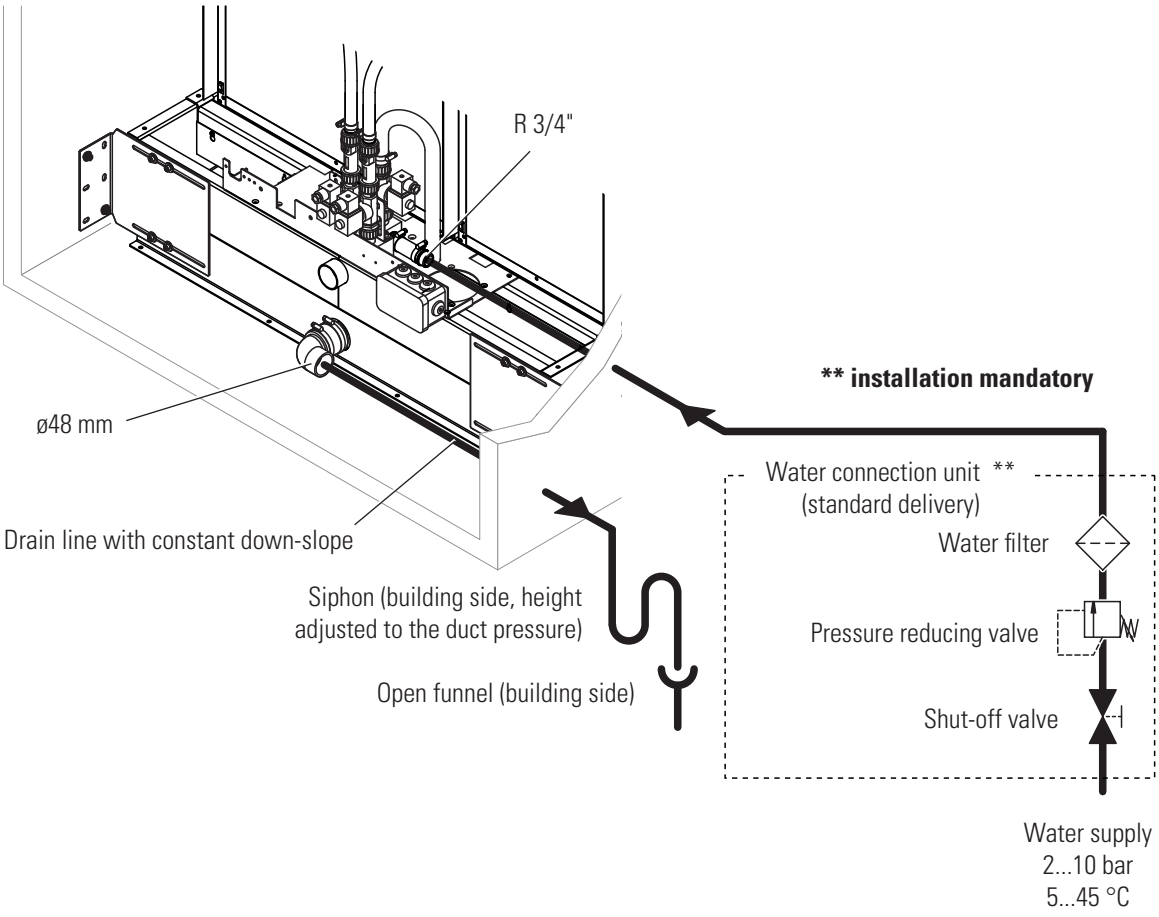
Model “flow”



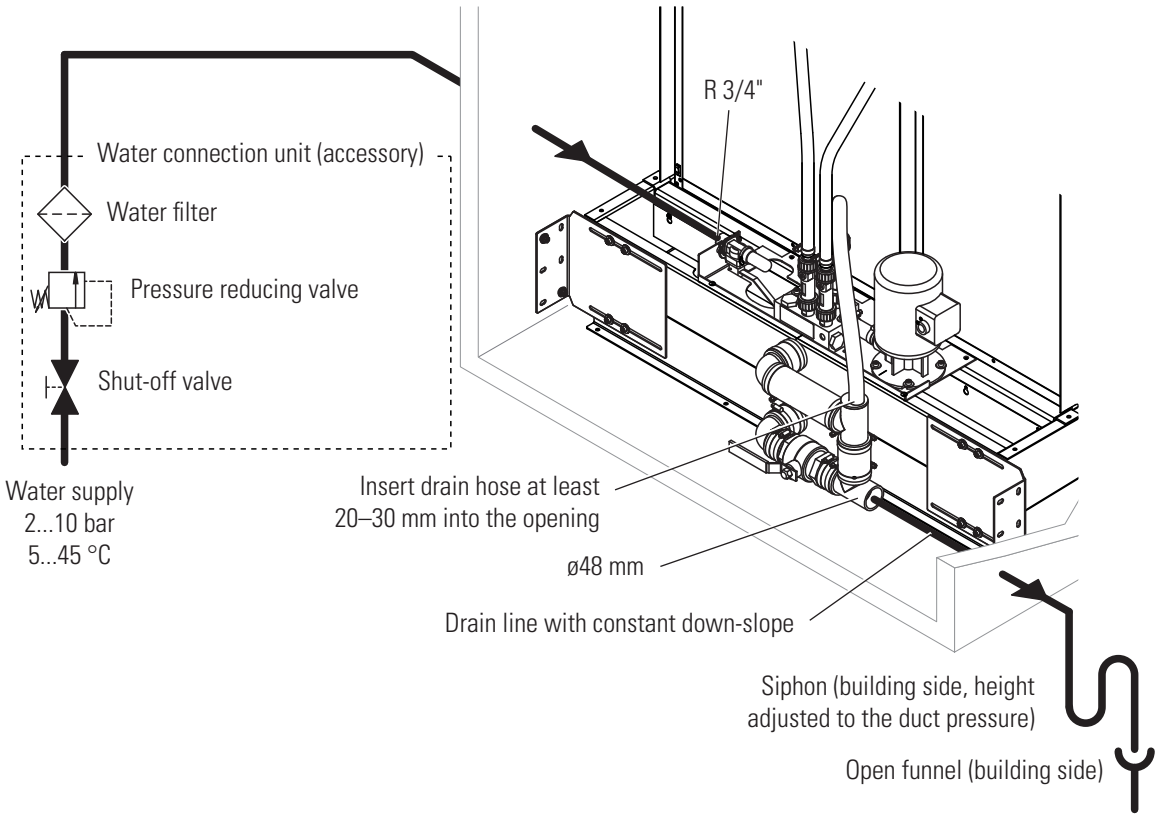
Model “flow C”



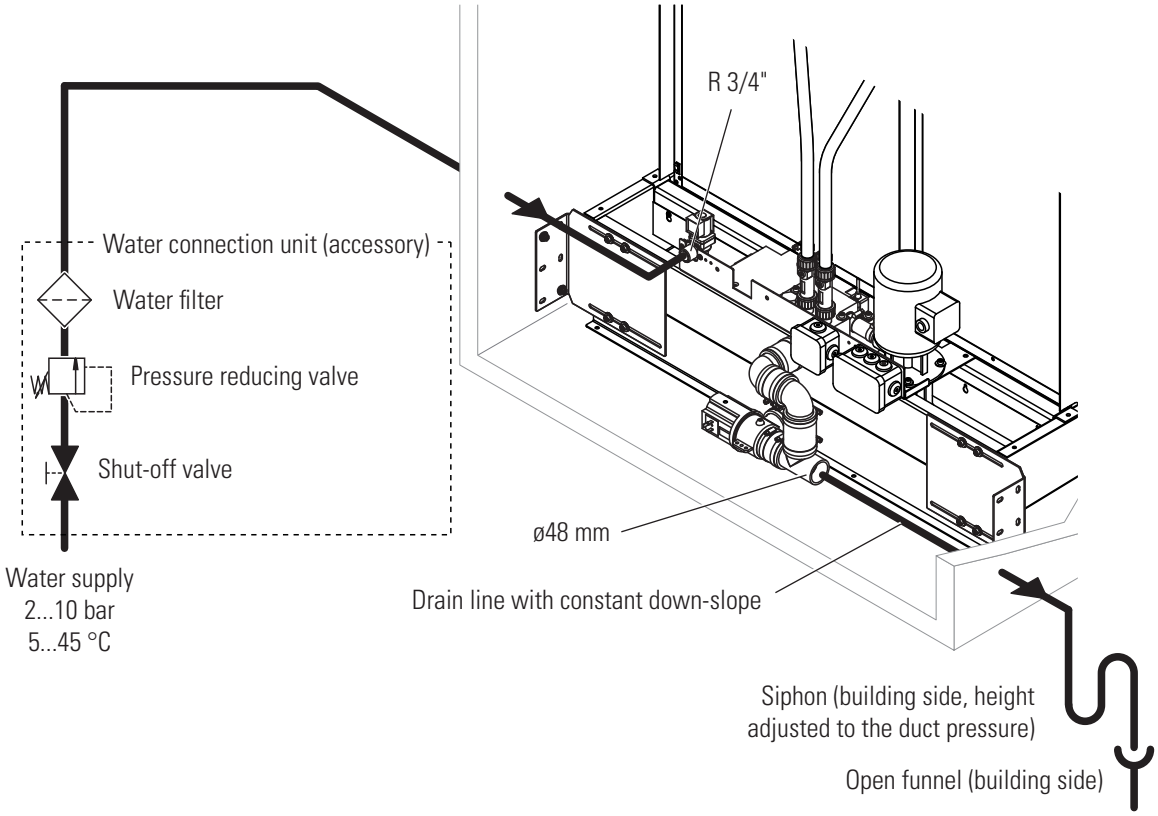
Model “flow SC”



Model “REflow”



Models “REflow C” and “REflow SC”



4.3.2 Notes on water installation

Water supply

The water supply is to be carried out according to the figure found in chapter 4.3.1 and the applicable local regulations for water installations. The indicated connection specifications must be observed.

- The installation of the **shut-off valve**, **pressure reducing valve** and a **water filter** should be made as close as possible to the unit.
- **Notes on water quality**:
  - For the water supply of the Condair SH2, use exclusively **untreated drinking water**, **fully demineralised water** or **partly softened water with a max of 100 cfu/ml**.
  - The **use of additives** such as corrosion inhibitors, disinfectants, etc. is **not allowed**, since these additives may endanger health and affect proper operation.
  - If the Condair SH2 shall be operated with softened water, please contact your Condair supplier.
- The connection material must be **pressure-proof** and certified for use in **drinking water supply systems**.
- **Important!** Before connecting the water line to the unit, the line must be flushed thoroughly.

CAUTION!	The thread at the humidifier connection is made of plastic. To avoid overtightening, the union nut of the water pipe must be **tightened by hand** only.

Water drain

The water drain is to be carried out according to the figure found in chapter 4.3.1 and the applicable local regulations for water installations. The indicated connection specifications must be observed.

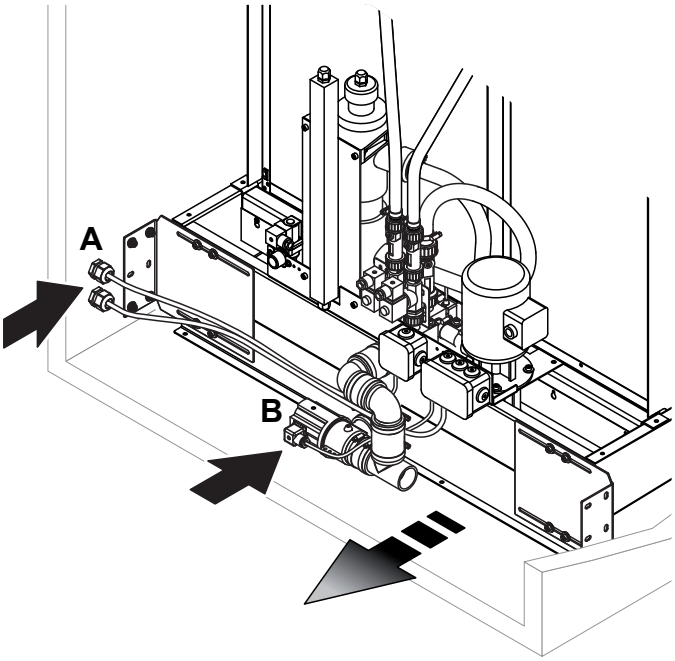
- Make sure the drain line is installed with a constant down-slope to the siphon of the building.
- Make sure the drain pipe is correctly fixed and easily accessible for inspections and cleaning purposes.
- The minimum inside diameter of the drain pipe of 42 mm must be maintained throughout the entire length!

When operating the Condair SH2 with fully demineralised water:
Fully demineralised water is aggressive! For this reason, use exclusively **plastic or stainless steel installation materials** (min. DIN 1.4301).

4.4 Electric installation

Note: the electric installation of the unit models Condair SH2 "flow" and "REflow" is by the clients responsibility.

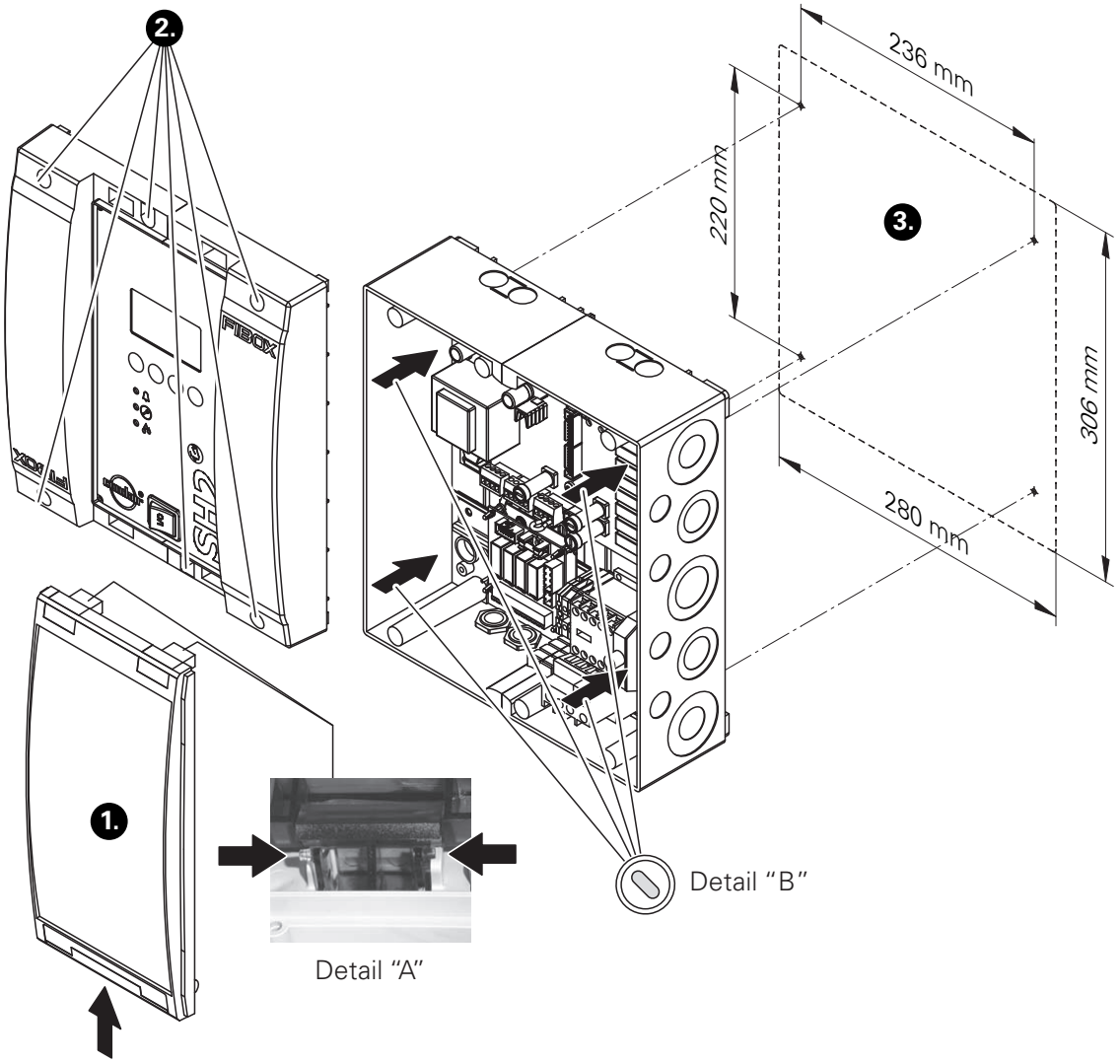
4.4.1 Leading the electric cables out of the duct



1. Lead the cable(s) of the connecting boxe(s) via cable gland(s) "A" out of the duct.
2. Models "REflow C" and "REflow SC": Connect plug "B" of the supply cable to the connector of the drain valve and secure it with the screw.

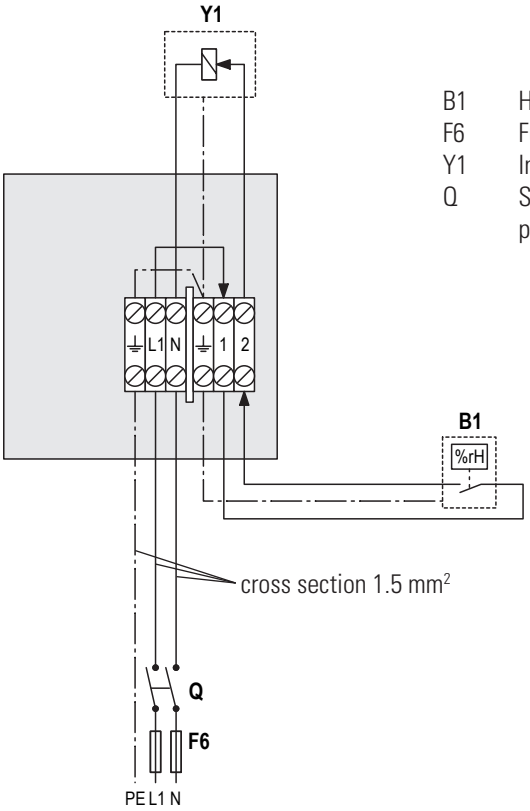
4.4.2 Mounting the control unit SH2

CAUTION!	The **electronic components** inside the control unit are **very sensitive to electrostatic discharge**. When the unit is open for installation work, appropriate measures must be taken to **protect these components against damage caused by electrostatic discharge (ESD protection)**.



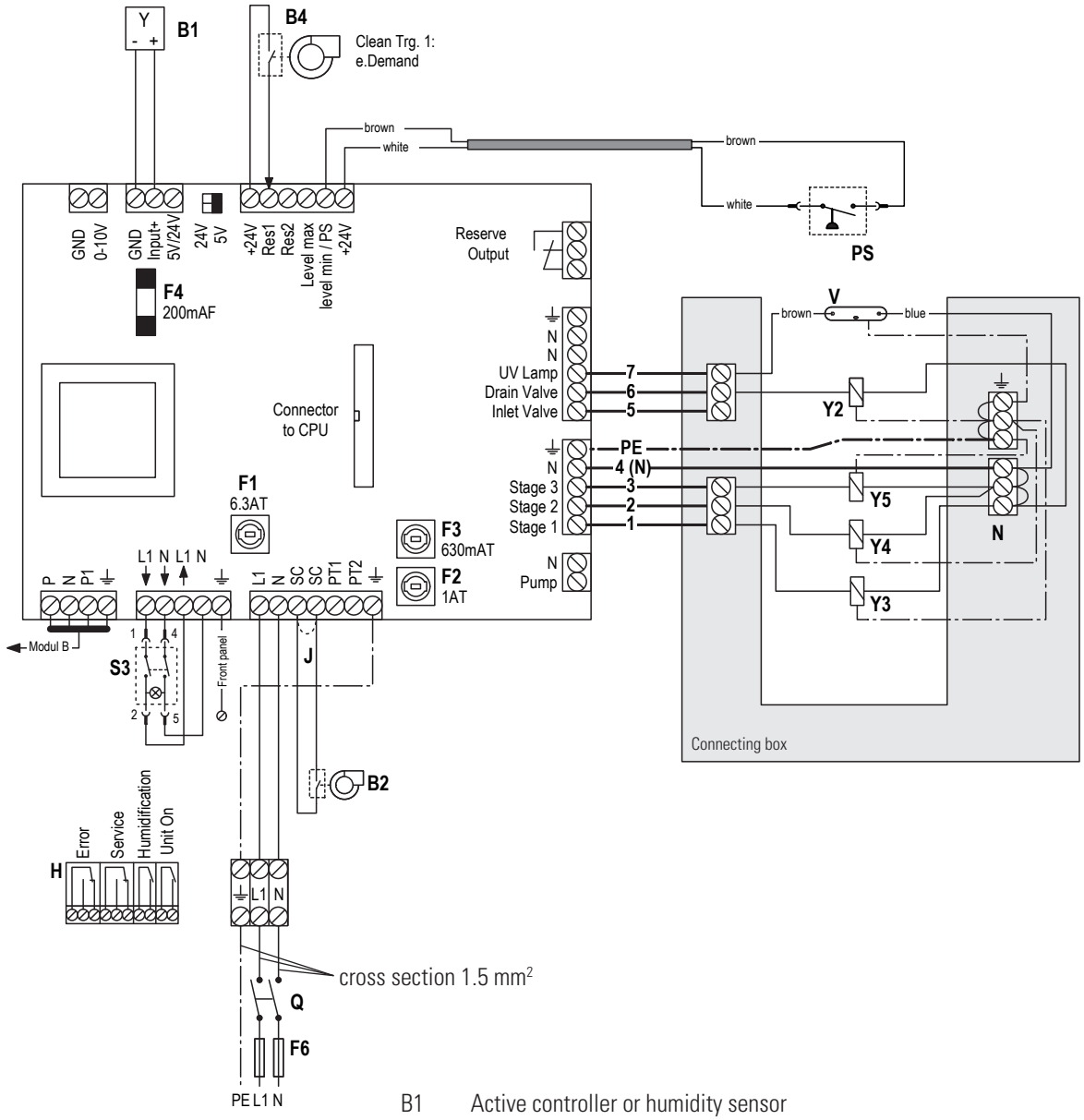
1. Unlock and swivel up the transparent cover, then unlock the two hinges (see detail "A") and remove the cover.
2. Undo the 6 screws, then carefully lift the control unit cover and disconnect the cables on the electronic.
3. Break out the 4 oblong holes in the bottom of the unit housing and fix the control unit to the wall using 4 screws.
4. Connect the cables from the connecting box(es), the voltage supply, etc. to the corresponding terminals in the control unit according the appropriate wiring diagram (see chapter 4.4.3, 4.4.4, 4.4.5 and 4.4.6).
   Important: all cables must be lead into the control unit via the cable glands in the housing.

4.4.3 Wiring diagram Condair SH2 flow C



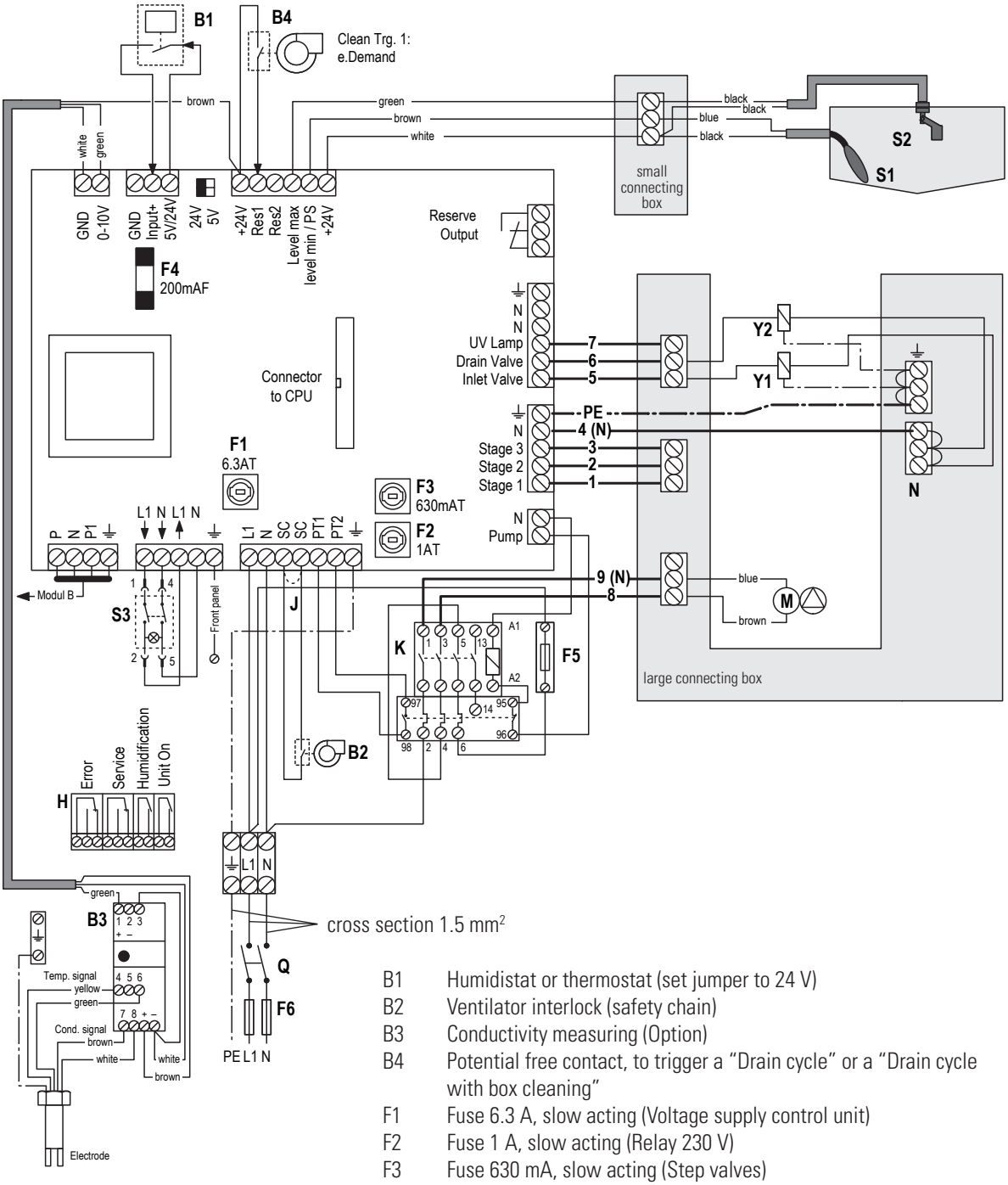
B1 Humidistat or thermostat (230V/2A)
F6 Fuse 2 A, slow acting (voltage supply)
Y1 Inlet valve
Q Service switch (min. contact opening 3 mm) or plug connection (**installation mandatory**)

4.4.4 Wiring diagram Condair SH2 flow SC



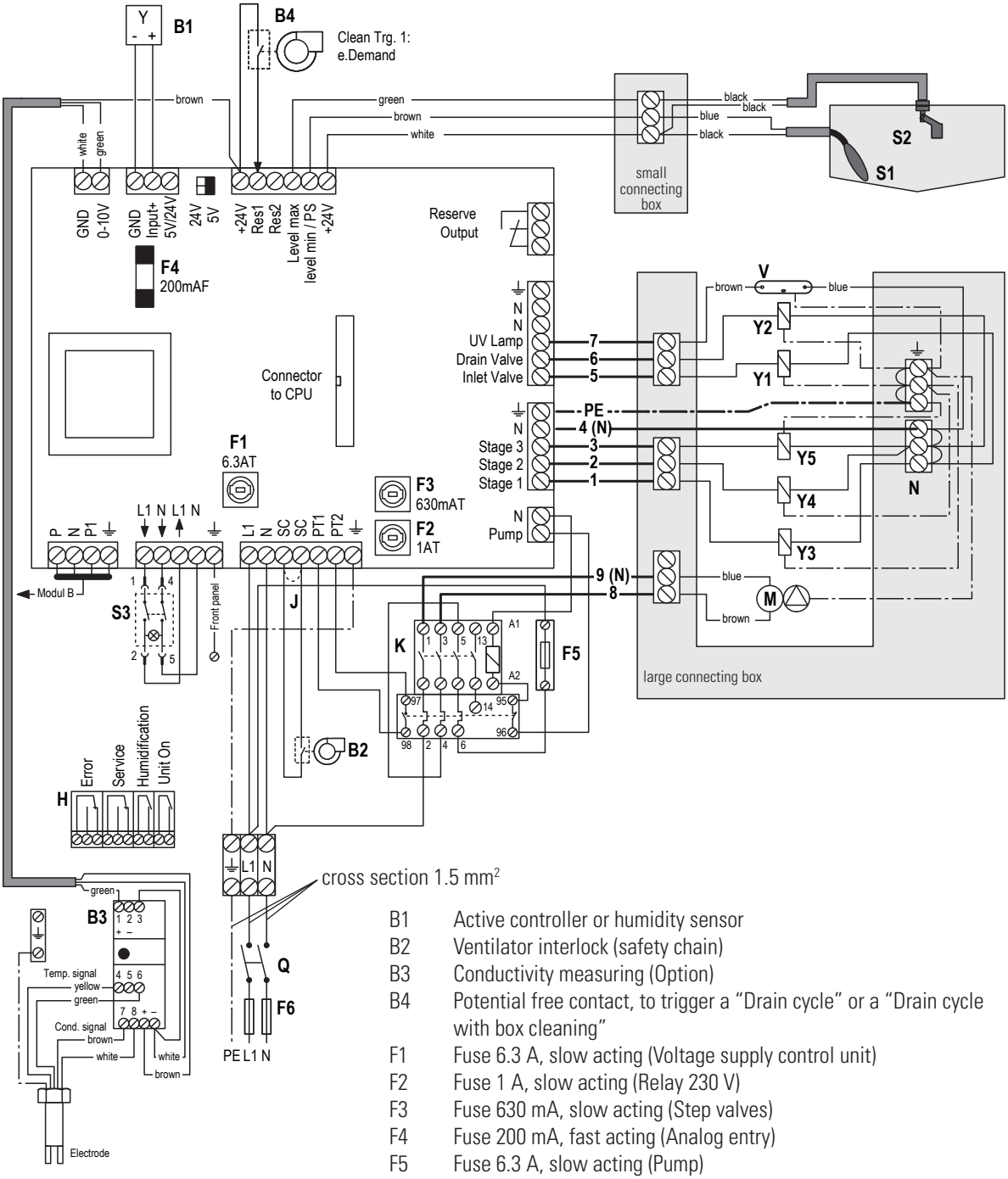
B1	Active controller or humidity sensor
B2	Ventilator interlock (safety chain)
B4	Potential free contact, to trigger a “Drain cycle” or a “Drain cycle with box cleaning”
F1	Fuse 6.3 A, slow acting (Voltage supply control unit)
F2	Fuse 1 A, slow acting (Relay 230 V)
F3	Fuse 630 mA, slow acting (Step valves)
F4	Fuse 200 mA, fast acting (Analog entry)
F6	Fuse 10 A, slow acting (Voltage supply)
H	Remote operating and fault indication (Option)
J	Cable bridge (must be removed, if “B2” is not connected)
PS	Pressure switch
S3	Unit switch
Y2	Rinsing valve
Y3-Y5	Step valves
Q	Service switch (min. contact opening 3 mm) or plug connection (**installation mandatory**)
V	UV lamp for water sterilisation (Option)

4.4.5 Wiring diagram Condair SH2 REflow C



B1	Humidistat or thermostat (set jumper to 24 V)
B2	Ventilator interlock (safety chain)
B3	Conductivity measuring (Option)
B4	Potential free contact, to trigger a “Drain cycle” or a “Drain cycle with box cleaning”
F1	Fuse 6.3 A, slow acting (Voltage supply control unit)
F2	Fuse 1 A, slow acting (Relay 230 V)
F3	Fuse 630 mA, slow acting (Step valves)
F4	Fuse 200 mA, fast acting (Analog entry)
F5	Fuse 6.3 A, slow acting (Pump)
F6	Fuse 10 A, slow acting (Voltage supply)
H	Remote operating and fault indication (Option)
J	Cable bridge (must be removed, if “B2” is not connected)
K	Main contactor with resettable protective motor switch
M	Pump
S1	Level switch (min. level)
S2	Level switch (operating level)
S3	Unit switch
Y1	Inlet valve
Y2	Drain valve
Q	Service switch (min. contact opening 3 mm) or plug connection (**installation mandatory**)

4.4.6 Wiring diagram Condair SH2 REflow SC



B1	Active controller or humidity sensor
B2	Ventilator interlock (safety chain)
B3	Conductivity measuring (Option)
B4	Potential free contact, to trigger a “Drain cycle” or a “Drain cycle with box cleaning”
F1	Fuse 6.3 A, slow acting (Voltage supply control unit)
F2	Fuse 1 A, slow acting (Relay 230 V)
F3	Fuse 630 mA, slow acting (Step valves)
F4	Fuse 200 mA, fast acting (Analog entry)
F5	Fuse 6.3 A, slow acting (Pump)
F6	Fuse 10 A, slow acting (Voltage supply)
H	Remote operating and fault indication (Option)
J	Cable bridge (must be removed, if “B2” is not connected)
K	Main contactor with resettable protective motor switch
M	Pump
S1	Level switch (min. level)
S2	Level switch (operating level)
S3	Unit switch
Y1	Inlet valve
Y2	Drain valve
Y3-Y5	Step valves
Q	Service switch (min. contact opening 3 mm) or plug connection (**installation mandatory**)
V	UV lamp for water sterilisation (Option)

5 Operation

5.1 Putting into operation

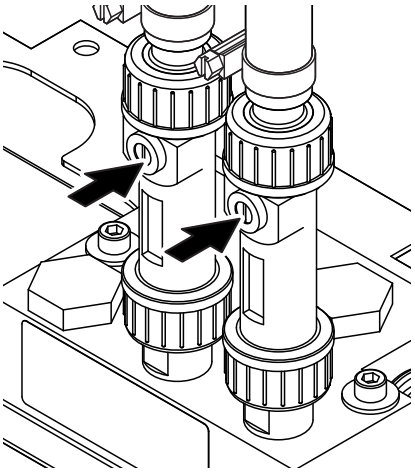
Proceed as follows when putting the Condair SH2 into operation:

1. **Examine the Condair SH2 and installation for possible damage**.

DANGER!	Damaged devices or devices with damaged installation may present danger to human life or cause severe damage to material assets. **Damaged units and/or units with damaged or faulty installation must not be operated.**

2. **Models flow C, flow SC, REflow, REflow C and REflow SC**: Make sure the connecting box(es) and the control unit are closed and that all cables are lead through cable glands.
3. Open the **shut-off valve** in the water supply line.
4. **Switch on the service switch** in the mains supply.
5. **Models flow SC, REflow C and REflow SC: switch on the control unit SH2** (the unit switch lights up).
   Note: regarding the operation of the control unit SH2 please observe the information given in the separate operating instructions to the control unit SH2.
6. Check the settings of the humidistat/thermostat or the humidity controller, respectively. If necessary, adjust settings.

5.2 Adjust the volume controlling valves



After first time commissioning of the Condair SH2 the volume controlling valves must be adjusted to the local operating conditions according to the separate instructions.

5.3 Notes on operation

During operation of the Condair SH2 the humidification system has to be inspected weekly. On this occasion check the following:

- the water for any leakage.
- the humidifier and the other system components for correct fixing and any damage.
- the electric installation for any damage.
- Unit models with control unit SH2: Check operating information in display level and whether or not a warning or error message is present.

If the inspection reveals any irregularities (e.g. leakage, error indication) or any damaged components take the Condair SH2 out of operation as described in chapter 5.4. Then, have the malfunction be eliminated or the damaged component be replaced by a well trained specialist or a service technician from your Condair supplier.

5.4 Taking out of operation

In order to take the Condair SH2 out of operation (e.g. to perform maintenance works, to eliminate a malfunction, etc.) perform the following steps:

1. Close the shut-off valve in the water supply line.
2. **Models REflow, REflow C and REflow SC**: empty the water tub.
   – Model REflow: Open the shut-off valve in the water drain line. If the water tub is empty close the shut-off valve again.
   – Models REflow C and REflow SC: Start manual draining (see operating instructions of the control unit SH2) and wait until the water tub is empty.
3. **Models flow SC, REflow C and REflow SC:** switch off control unit.
   Important: If the unit has to be switched off because of a malfunction, please note the code of the actual error message.
4. **Isolate all components of the Condair SH2 from the mains** and **secure system against accidentally being reconnected to the mains**.
5. If work has to be carried out on the Condair SH2, switch off the ventilation system and secure the system against accidentally being switched on.

Note: if the Condair SH2 is not be used for a longer period of time the models flow, flow C and REflow should be taken out of operation as described above. However, the models flow SC, REflow C and REflow SC should stay operable to keep the hygiene functions active.

6 Maintenance

6.1 Important notes on maintenance

Qualification of personnel

All maintenance work must be carried out only by **well qualified and trained personnel authorised by the owner**. It is the owner's responsibility to verify proper qualification of the personnel.

General note

The instructions and details for maintenance work must be followed and upheld.

Only the maintenance work described in this documentation may be carried out.

Only use original Condair spare parts to replace faulty parts.

Safety

Before carrying out any maintenance work take the Condair SH2 out of operation as described in chapter 5.4 and secure the unit against inadvertent power-up. In addition the take ventilation system out of operation as described in the operations instructions of the ventilation system and secure the ventilation system against inadvertent power-up.

The Condair SH2 must be maintained in the prescribed intervals, the cleaning work must be carried out correctly and the humidification boxes and the mist eliminator boxes must be replaced after their prescribed lifetime has elapsed.

⚠ **WARNING!**	**If the unit is insufficient maintained ill-making germs may grow in the water tub and the humidification boxes (and the mist eliminator) of the Condair SH2 and may can affect the air passing through the humidifier.**

6.2 Maintenance intervals

In order to maintain operational safety the Condair SH2 must be maintained in regular intervals. The time interval for the maintenance is to be adapted to the operating conditions. The hygiene status depends mainly on the quality of the humidifier water but also on the adherence to the exchange intervals of the upstream air filter, the air velocity and the micro-biological and chemical composition of the supply air. Therefore the maintenance intervals must be determined for each system separately.
The **first maintenance must be carried out after 800 operating hours**. Depending on the encountered hygiene status during the first maintenance the interval time must be decreased or increased.
In any case the Condair SH2 is to be maintained however at least twice annually.

On units equipped with a SH2 control unit (flow SC, REflow C and REflow SC) the maintenance interval can be programmed. As soon as the maintenance time has elapsed, a maintenance message is displayed to draw your attention to the pending maintenance. To determine the maintenance interval time the above described procedure can be used.

6.3 Maintenance work

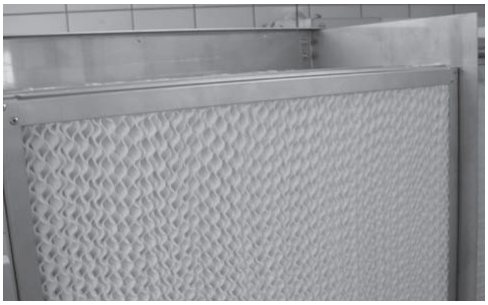
Component	Work to be carried out
Humidification boxes and mist eliminator boxes	Dismantle and check the humidification boxes (and mist eliminator boxes). Clean the frame of the boxes with a combined detergent and disinfectant. If the humidifier fleece is heavily soiled, the humidification boxes have to be replaced. Note: If the humidification boxes indicate strong dust deposit, the air filter of the ventilation system is to be controlled (filter quality at least F7 or EU7).
Water tub	Check water tub for soiling (dust, slime, mineral deposit, etc.) and clean with a combined detergent and disinfectant. Note: the actual hygiene status indicates, whether the maintenance interval time must be decreased or increased.
Frame structure	Check screw connections of the frame structure, tight loose screw connections. Clean frame structure with a combined detergent and disinfectant.
Duct section downstream of the humidifier	Check the duct section behind the humidifier (downstream) for collection of residual water. If residual water is present: Check air velocity above the humidification boxes (without mist eliminator max. 3.5 m/s, with mist eliminator max. 4.5 m/s or 5.5 m/s, respectively). Mount mist eliminator if necessary. Clean duct with a combined detergent and disinfectant.
Hydraulic unit	Check connections and components for sealing and correct fastening. Seal/replace leaky components, replace defective components, fasten loose components. Carefully clean the components of the hydraulic unit with a combined detergent and disinfectant.

Water installation	Check water the water hoses of the humidifier for cracks and correct fastening, replace defective hoses. Carefully clean the hoses with a combined detergent and disinfectant. Check water supply line for sealing and seal if necessary. Dismantle water filter (if present) and clean it.
Trickling hood	Dismantle the trickling hoods and check the holes in the water distribution pipes for mineral deposit. If necessary, dismantle the water distribution pipes and remove the mineral deposit. Clean trickling hood and water distribution pipes with a combined detergent and disinfectant.
Drain line with Siphon	Check and clean with a combined detergent and disinfectant, if necessary.
UV water treatment (Option)	Dismantle the UV lamp. Carefully clean glass tube and UV lamp (see chapter 6.4.2). After max. of 8000 operating hours the UV lamp must be replaced.
Electric installation	Check all cables and components for correct fastening, correct function and defects. Let have defective components be replaced or loose components be fastened by a qualified specialist.

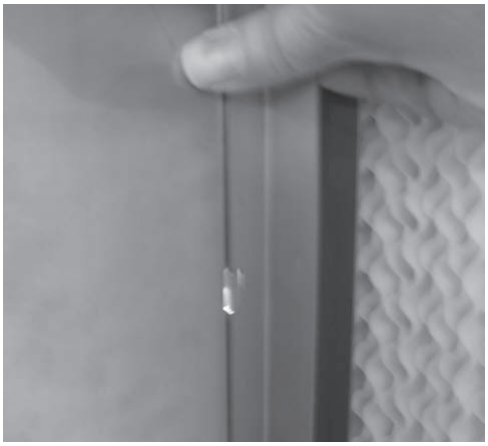
6.4 Dismantling and installation works

6.4.1 Dismantle and install the mist eliminator and humidification boxes

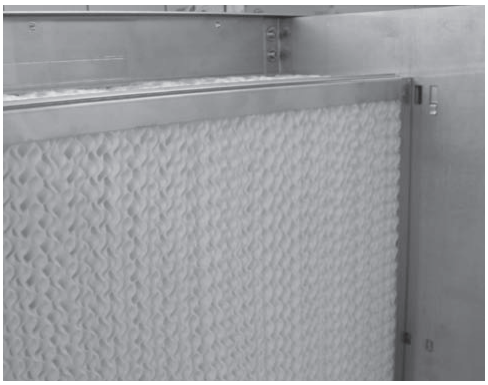
1. Undo the hose clamps, then pull off the hoses from the connections on the trickling hoods.
2. Lift the trickling hoods on the water connection side and remove them to the front.



3. Starting from the top remove the mist eliminator boxes (push box upwards and remove it to the front).



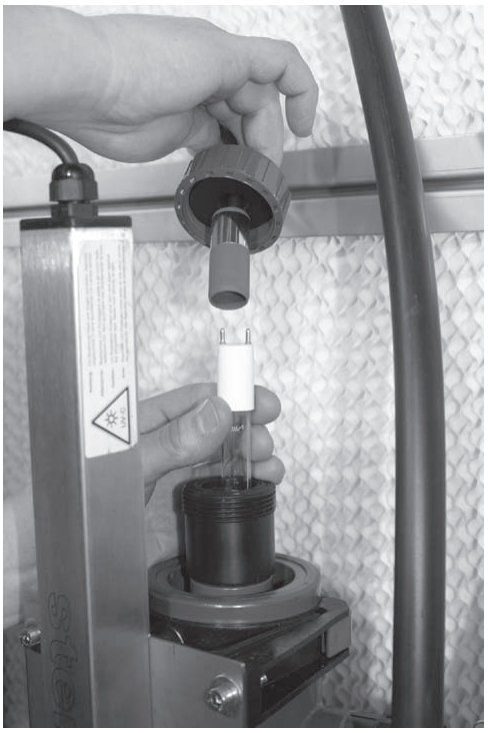
4. Release the fixing clip in the middle of the mounting bracket by pressing slightly on the vertical support, then carefully push the mounting bracket upwards and remove it. Repeat this step for all mounting brackets.



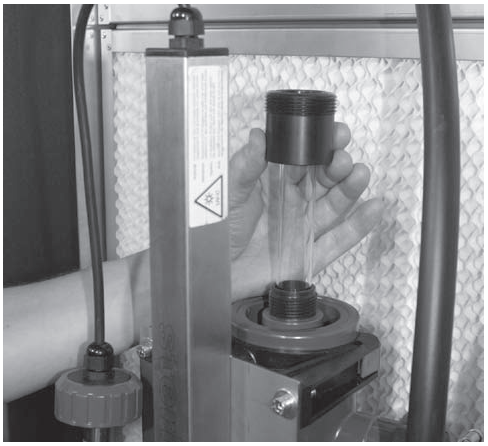
5. Starting from the top remove the humidification boxes (push box upwards and remove it to the front).

The installation of the cleaned or the new humidification boxes/mist eliminator boxes follows the reverse dismantling order.

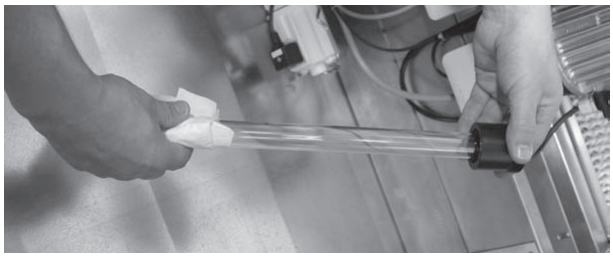
6.4.2 Dismantle and install the UV lamp (option)



1. Undo the union nut, then carefully pull off the connection plug upwards.
2. Carefully pull the UV lamp out of the socket and remove it to the top.



3. Remove glass tube to the top. Clean glass tube outside and inside with a lint-free and soft cloth.



The installation of the UV lamp follows the reverse dismantling order.

CAUTION!	**When installing the UV lamp, make sure to hold the lamp until it is completely inserted. Under no circumstances let the lamp fall inside the holder, since this could damage the lamp.**

6.5 Resetting the maintenance indication

When maintenance work has been completed the **maintenance indication** must be reset on the unit models flow SC, REflow C and REflow SC (yellow LED lights). For that purpose, please observe the information given in the separate operating instructions for the SH2 control unit.

7 Malfunctions

Important! Most operational malfunctions are not caused by faulty equipment but rather by improper installation or disregarding of planning guidelines. Therefore, a complete fault diagnosis always involves a thorough examination of the entire system.

7.1 Malfunction list

Malfunction	Cause	Remedy
Residual water in the section of the duct behind (downstream) the Condair SH2.	Air velocity above the humidification boxes is too high. Units without mist eliminator max 3.5 m/s, Units with a 100 mm mist eliminator max. 4.5 m/s, with a 200 mm mist eliminator max. 5.5 m/s	Install mist eliminator or reduce air velocity in the duct.
	Water drain is leaking.	Check/seal water drain.
Humidity/Cooling demand present however the Condair SH2 does not humidify.	Shut-off valve in the water supply line closed.	Open shut-off valve.
	Models REflow: Circulation pump defective.	Replace circulation pump.
Maximum humidification/cooling capacity is not reached.	System incorrectly dimensioned (insufficient capacity).	Contact your Condair supplier.
	Insufficient water supply capacity.	Check water supply, increase water pressure.
	Models with SH2 control unit: Output limitation active.	Deactivate output limitation (see separate operating instructions for SH2 control unit)

Note: On units equipped with a SH2 control unit (flow SC, REflow C and REflow SC) malfunctions during operation are indicated by a corresponding event message in the display. For that purpose, please observe the information given in the separate operating instructions for the SH2 control unit .

7.2 Notes on fault elimination

⚠ **DANGER!**	In order to eliminate faults, the Condair SH2 must be set out of operation as described in chapter 5.4. **Disconnect the unit from the mains and secure the unit against inadvertent power-up**.

Only allow trained and qualified personnel to repair faults. Faults relating to electrical installation must only be carried out by authorized personnel or your Condair representative's service technician.

Repair work and replacement of faulty components must only be carried out by your Condair representative's service technician!

8 Taking out of service/Disposal

8.1 Taking out of service

If the Condair SH2 must be replaced or if the humidification system is not needed any more, proceed as follows:

1. Take the unit out of operation as described in chapter 5.4.
2. Have the unit (and all other system components, if necessary) unmounted by a qualified service technician.

8.2 Disposal/Recycling

Dismantled components must be disposed of and/or recycled according to the local regulations. In case of doubt please contact your Condair supplier.

9 Product specifications

9.1 Technical data

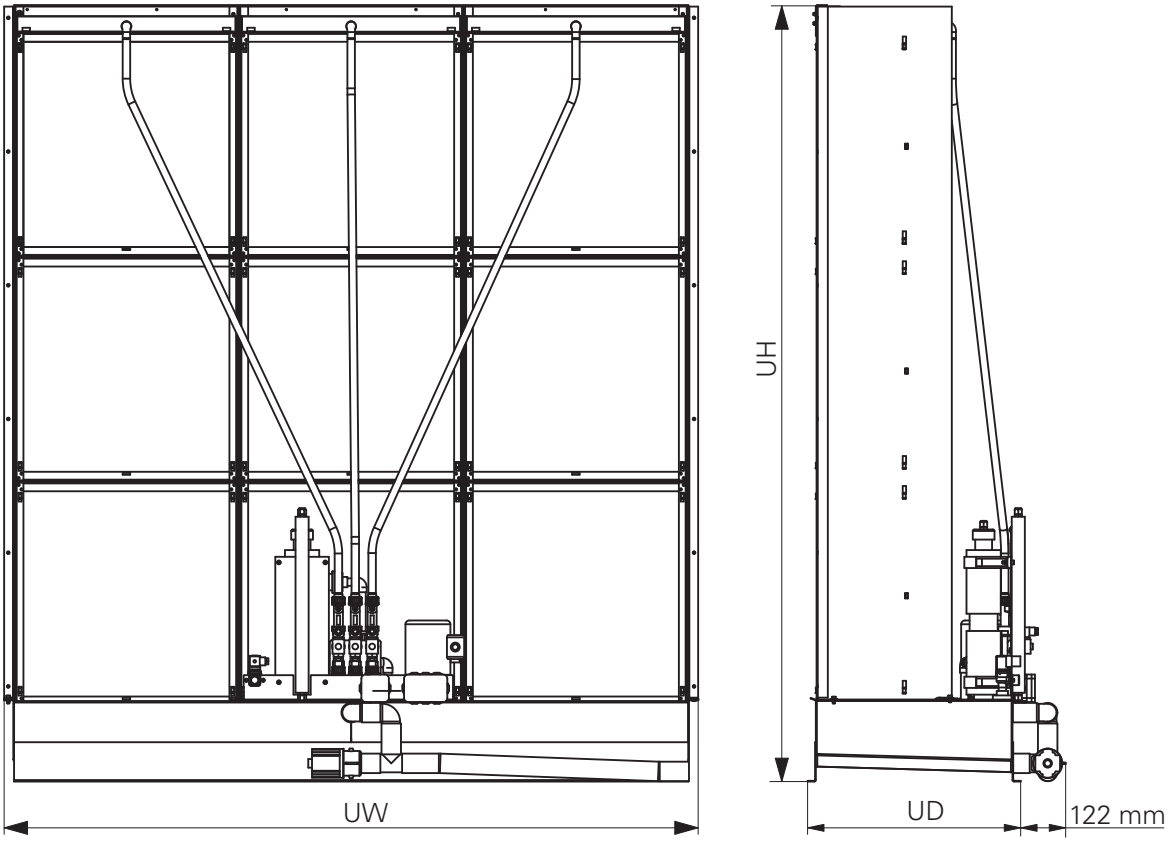
	Condair SH2 models					
	flow	**flow C**	**flow SC**	**REflow**	**REflow C**	**REflow SC**
Control	—	Control RC	Control SH2	—	Control SH2	Control SH2
Control supply voltage	—	230 VAC/ 50..60 Hz	230 VAC/ 50..60 Hz	—	230 VAC/ 50..60 Hz	230 VAC/ 50..60 Hz
Circulation pump supply voltage	—	—	—	230 VAC/50..60 Hz		
Control signals	—	potential free contact of an external humidistat/ thermostat	0...5 VDC 1...5 VDC 0..10 VDC 2...10 VDC 0...16 VDC 3.2...16 VDC 0..20 mA 4..20 mA	—	potential free contact of an external humidistat/ thermostat	0...5 VDC 1...5 VDC 0..10 VDC 2...10 VDC 0...16 VDC 3.2...16 VDC 0..20 mA 4..20 mA
Control characteristics	On/Off	On/Off	Step control	On/Off	On/Off	Step control
Control accuracy	Control accuracy depends on air conditions, control distance, water quality and probably on the number of On/Off cycles					
Max. admissible air speed above humidification boxes	3.5 m/s (4.5 m/s with 100 mm mist eliminator, 5.5 m/s with 200 mm mist eliminator)					
Water supply	R 3/4" outside thread					
Water drain	48 mm outside diameter of tube					
Admissible water supply pressure	2...10 bar	2...10 bar	2...10 bar	2...10 bar	2...10 bar	2...10 bar
Admissible water temperature	5...45 °C					
Water quality	Tap water, softened or fully demineralised water with a max. of 100 cfu/ml					
Pressure drop	typically 70 Pa at 2.5 m/s, 90 %rh					
Admissible ambient temperature (Control unit)	—	1...40 °C	1...40 °C	—	1...40 °C	1...40 °C
Admissible ambient humidity (Control unit)	—	max. 75 %rh	max. 75 %rh	—	max. 75 %rh	max. 75 %rh
Degree of protection of Control unit	—	IP54	IP54	—	IP54	IP54
Degree of protection of pump, valves. etc.	—	IP54/IP65	IP54/IP65	IP54/IP65	IP54/IP65	IP54/IP65
Conformity	CE marking					
Fire classification of humidification medium	DIN EN 53438 Class F1					

Accessories						
– Supply valve (230 V)	•	S			S	S
– Water connection unit	•	•	S	•	•	•
– Duct humidistat HBC	•	•	•	•	•	•
– Room humidistat HSC	•	•	•	•	•	•
– Duct humidity sensor (continuous) EGH 110			•			•
– Room humidity sensor (continuous) EGH 130			•			•
– Remote indication PCB On/Error/Maintenance/Humidification			•		•	•
– EPDM sealing profile 300/3	•	•	•	•	•	•

Options						
– UV water treatment			•			•
– Drain valve (230 V)				•	S	S
– Conductivity monitoring					•	•

S= Standard equipment

9.2 Unit dimensions



UH: 730 ...3130 mm (graduation 150 mm)

UW : 660 ...3060 mm (graduation 200 mm)

UD:

Max. humidification efficiency	Depth Humidification box	Depth Mist eliminator	**Depth UD**
85 %	200 mm	—	**573 mm**
85 %	200 mm	100 mm	**573 mm**
85 %	200 mm	200 mm	**673 mm**
95 %	300 mm	—	**673 mm**
95 %	300 mm	100 mm	**673 mm**
95 %	300 mm	200 mm	**773 mm**

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